A review of the social, economic and environmental benefits and constraints linked to wild land in Scotland

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Commissioned Report No. 919

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Scottish Natural Heritage
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All of nature for all of Scotland
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COMMISSIONED REPORT

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COMMISSIONED REPORT

Summary

A review of the social, economic and environmental benefits and constraints linked to wild land in Scotland

Commissioned Report No. 919
Project No: 15785
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Keywords

Wild land; ecosystem services; benefits; constraints.

Background

Wild land is an important component of Scotland's natural environment. Scottish Planning Policy highlights that wild land character is displayed in some of Scotland's remoter upland, mountain and coastal areas with a strong sense of remoteness, ruggedness, lack of human artifacts and perceived naturalness. SNH has identified 42 Wild Land Areas, and this report provides evidence on the benefits and constraints associated with wild land.

Main findings

- Wild land is associated with a range of economic benefits particularly in relation to tourism and recreation. Areas with wild land qualities are also linked to sporting activities such as grouse shooting and deer stalking. There is limited forestry and agriculture within the Wild Land Areas, but these activities may be locally important in the surrounding countryside. However, although this range of activities can be linked to wild land qualities, the available data is unable to quantify the benefits with any precision.
- The Wild Land Areas contain nationally important stocks of a range of habitats which can be associated with a range of ecosystem services. In particular, Wild Land Areas provide important regulating services including erosion control, water flow regulation and climate change mitigation. The supply of cultural ecosystem services such as recreation and well-being is particularly high.
- Stakeholders across ten Wild Land Area case studies generally viewed the wild land qualities of their areas to be of local and national importance and a key element in promoting the areas. Despite their natural appearance, stakeholders noted they were the result of historic and current use. The benefits from Wild Land Areas were often perceived to be the result of some management activities, with potential to enhance the benefits through investment in habitat restoration. Some concerns over the perceived constraints to change in these areas were also raised.

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Table of Contents **Page**

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EXECUTIVE SUMMARY

Background and methodology

In 2002 SNH produced a Policy Statement on Wildness in Scotland's Countryside. Since then there have been a number of studies looking at the benefits associated with wild landscapes and public attitudes to wild land. Formal definitions of wild land qualities (perceived naturalness, ruggedness, remoteness and lack of human artefacts) have also been used to identify and map 42 Wild Land Areas across Scotland. Wild land character and the 2014 SNH map of Wild Land Areas is specifically mentioned in Scottish Planning Policy.

The aim of this study is to review and update previous estimates of the benefits of wild land, to identify the ecosystem services produced by wild land, and to explore the benefits and constraints associated with wild land through a number of case studies in the Wild Land Areas.

Review and update of wild land benefits

A previous study by McMorran *et al*. (2006) identified a range of economic benefits that could be associated with 'landscapes of wild character'. These related to tourism, outdoor recreation and sporting land use, such as wild deer stalking and grouse shooting. While these activities can be associated with such areas, much of the more recently available data are not area specific and so cannot be readily applied to mapped Wild Land Areas.

Scenery and landscape are an important motivation for tourism visits to Scotland and locations that could be linked to wild land such as mountains, hills and moorland are important destinations for outdoor visits. However, much of the available data on tourism and outdoor recreation cannot be specifically linked to the Wild Land Areas.

Specific activities such as mountaineering can be associated with Wild Land Areas with greater confidence as 94% of Scotland's Munros are within those areas. We were, however, unable to update a 2003 figure of £197m of expenditure associated with hillwalking and mountaineering and data on participation rates were not available. However, indications are that participation has grown since the 2003 estimate. Other recreational activities where 'naturalness' can be a motivation such as mountain biking are also increasing in popularity.

Wildlife and nature based tourism are important sectors in areas associated with wild land. In particular the Highlands and Islands region accounts for 50% of wildlife tourism trips, although marine and coastal wildlife is also an important motivation for these trips.

Sporting management including grouse shooting and deer stalking were also found to be important in some areas with wild landscapes. These activities create both direct and indirect employment opportunities.

Ecosystems based assessment of wild land

In order to understand the potential supply of ecosystem services from the Wild Land Areas we undertook a mapping exercise to identify the key habitats within the Wild Land Areas. These areas were found to be nationally important for a number of habitat types. For example, the 42 Wild Land Areas account for 88% of Scotland's montane habitats, 79% of its montane vegetation, 52% of its blanket bog complexes, 49% of its wet heaths and 71% of its screes, inland cliffs and rock outcrops.

The habitats associated with wild land were then used to develop a shortlist of the ecosystem services that might be provided by the Wild Land Areas. The potential for provisioning services is generally low within the Wild Land Areas with the exception of

potential water supply from surface waters. Further analysis would be required to determine the extent to which that potential supply is utilised. Agriculture and forestry were not generally found to be important features of the Wild Land Areas, but were found in the adjacent countryside.

The potential for regulating services was generally high, although concentrated in particular habitat types. Surface waters (mediation of toxins and liquid flows) and blanket bogs (carbon sequestration) have the highest potential service provision scores. The generally high level of vegetation coverage also acts to counter erosion.

The potential for cultural service supply is relatively high across the habitats associated with Wild Land Areas. This reflects the dominance of cultural services such as tourism and recreation in the review of wild land benefits. Our analysis did not pick up ecosystem services that are provided by the landscape as a whole, rather than linked to specific habitats. This could greatly enhance the cultural services provided by the Wild Land Areas, particularly with respect to wild land atributes such as ruggedness.

Case studies

The preceding review of benefits could not identify data specifically related to the Wild Land Areas, and the habitat based ecosystem services assessment was unable to account fully for the wider landscape level context of wild land services. Case studies of individual Wild Land Areas provide the opportunity to explore the benefits and constraints of areas of wild land character.

Ten case studies were undertaken that reflected the varying contexts of the Wild Land Areas including size, location (across Scotland including islands), relative remoteness, and landscape type (including lowland). In each case study we interviewed a range of stakeholders including landowners/managers, conservation interests, communities, businesses and local authorities (including National Parks). The range of stakeholders varied between case studies. As well as interview questions on the benefits and constraints at different levels, respondents were also asked to complete a participatory mapping exercise to identify the areas within each wild land area that they associated with different ecosystem services.

The wild land qualities were viewed positively by stakeholders and identified with a considerable range of benefits to both people and nature. These areas were seen as being of the highest scenic quality, including iconic mountain landscapes of regional, national and international importance. The Wild Land Areas were felt to represent an important natural asset base for existing and future tourism markets and wild land imagery represents a key element of tourism marketing and branding in many areas. Perceived benefits were not just economic as improved health and wellbeing at personal, community and national scales were also identified.

Wild land was seen to provide important habitats and to host a range of important native species, with considerable potential for further ecological restoration in these areas. Such restoration may enhance the existing ecosystem service benefits of wild land. However the characterisation of places as Wild Land Areas can be perceived as a potential constraint to economic development. Respondents also noted that, despite their naturalness, a variety of management activities take place in the Wild Land Areas and these are important for maintaining wild land qualities and ensuring benefits to people and nature.

1. INTRODUCTION

There are large areas of Scotland where semi-natural landscapes show little sign of human influence; this together with characteristics such as remoteness and ruggedness contributes to a distinctive quality of 'wildness' in certain areas. Such areas are largely found in the north and west of the country and include mountains, moors and coast. The wild qualities of these landscapes are of great cultural importance, both to residents and visitors to Scotland, whether directly or indirectly experienced. These landscapes and the habitats they contain can also help to deliver a range of benefits in the form of ecosystem services. These include biodiversity, carbon storage, and natural flood defences as well as social benefits such as livelihoods associated with the management of Wild Land Areas which contribute to the maintenance of rural communities. However, safeguarding the wild character of these areas can also be perceived as a constraint and the fragile nature of the associated landscapes means there are potential tensions between different users and beneficiaries.

In 2006 CMS and SRUC (McMorran *et al*., 2006) were contracted by SNH to undertake a review of the benefits and opportunities attributable to Scotland's 'landscapes of wild character'. This was a broad description of wildness reflecting both the lack of defined Wild Land Areas in Scotland at that time and recognition that there are multiple criteria by which wild land can be defined. The 2006 study included remoteness, perceived naturalness, the degree of human artefacts and scale, although these were not used to attempt a mapping of wild land. Further, it was recognised that the term 'wild character' was likely to elicit a subjective perception of wildness rather than an objective classification, specifically the benefits related to wild character may not be linked to objective measures of wildness. As a consequence, the benefits estimated during that study are lacking in precision given more recent developments in the definition and mapping of Wild Land Areas.

In 2013, following detailed analysis of the relative wildness of all of Scotland's landscapes, SNH published a Core Areas of Wild Land map based on a composite spatial index of wild land criteria. This was followed by an extensive consultation exercise relating to the criteria used to identify wild land and the mapping process used. The outcome was the publication by SNH in June 2014 of a map identifying 42 separate Wild Land Areas across Scotland (although mostly confined in terms of numbers and area to the north-west and central Highlands). Scotland's Wild Land Areas (WLAs) and the index of relative wildness are illustrated in Figure 1. The term wild land area does not represent a formal or statutory designation, but indicates the most extensive areas where the qualities of wildness (remoteness, ruggedness, perceived naturalness and absence of human artefacts) are most strongly expressed. The total area of all 42 WLAs is just over 1.5 million ha, although these range in size from 4,110 ha (Ronas Hill and North Roe, Shetland) to 157,225 ha (Cairngorms) with a mean area of approximately 36,000 ha.

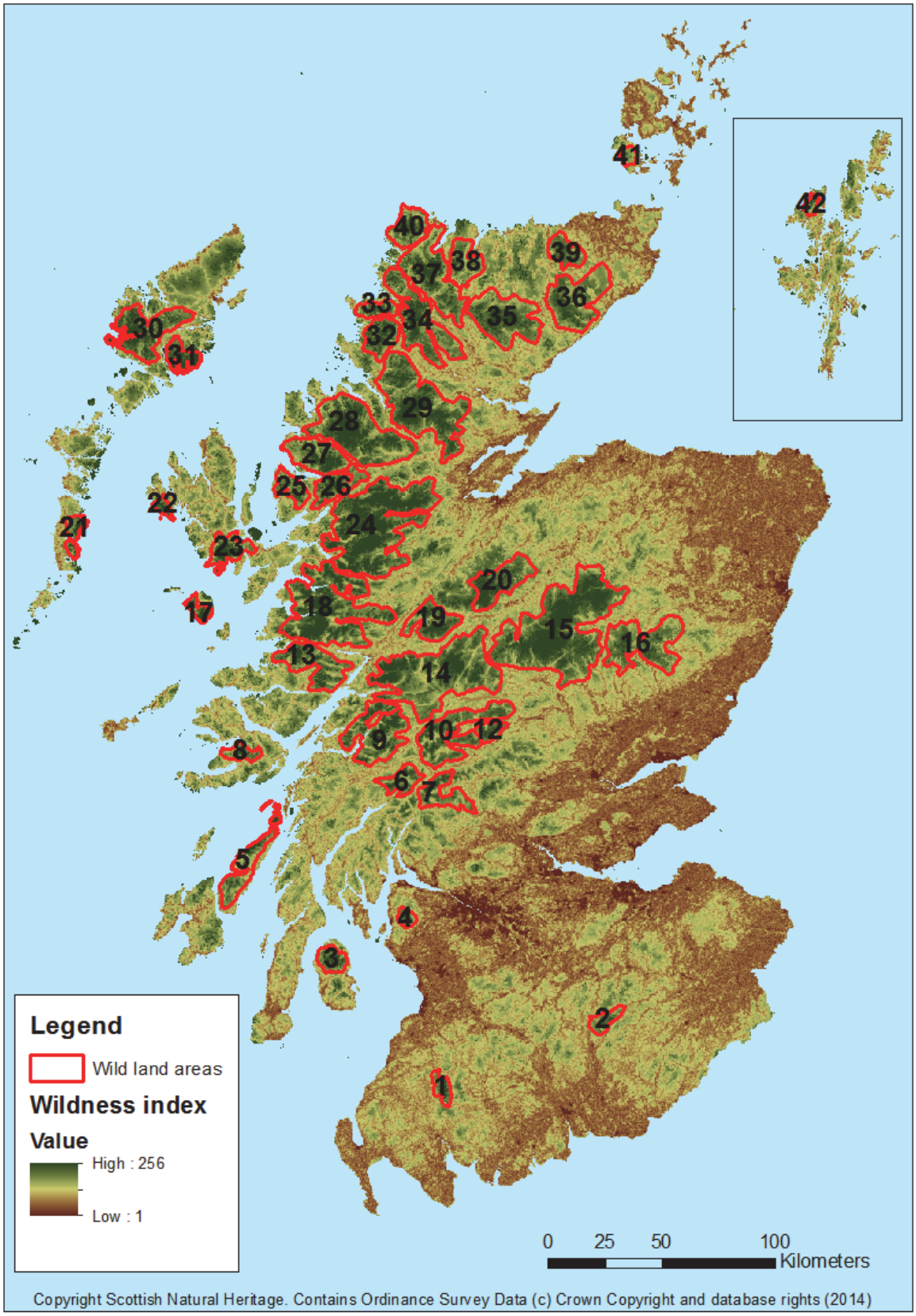


Figure 1. Scotland's 42 Wild Land Areas and wildness index 2014

2. RESEARCH OBJECTIVES AND METHODOLOGY

The purpose of this study is to determine what economic, environmental and social benefits and constraints are associated with Scotland's Wild Land Areas. The study comprises three tasks.

2.1 Review and update of previous studies of wild land

The 2006 study used a number of published data sources to obtain estimates for the economic benefits of landscapes of wild character. These were either directly relevant to areas that might be considered as wild land, such as discrete sites (e.g. flow country peatlands, Mar Lodge in the Cairngorms, native woodland in Glen Affric); related to activities that occur on wild land or land of wild character (e.g. deer management, grouse shooting); wild land related activities in regions associated with wild land (e.g. hillwalking and mountaineering in the Highland and Islands area); or activities or benefits that occur across Scotland that could be related to wild land but where apportionment is difficult (e.g. nature conservation on designated sites, outdoor visits). As a consequence of the variety of different data sources used in the 2006 study there is a varying degree of confidence that can be placed on the estimates obtained. The first stage of work for this report reviewed and revised these estimates with reference to updated data sources and new studies where these were available.

2.2 Development of an ecosystems based assessment framework

The 2006 study did not directly assess the environmental benefits (ecosystem services) of wild land beyond location specific studies where these were quantified economically. Since that study there has been widespread adoption of ecosystem services frameworks in environmental policy and regulation (e.g. as an underpinning principle of SNH's work and the Scottish Government's Land Use Strategy)[1]. The opportunity therefore exists to assess the benefits of wild land in a framework that is consistent with the ecosystem services concept.

Such an approach can identify the range of potential benefits flowing from wild land and determine whether these are environmental, social or economic in nature. The approach taken used a qualitative assessment of the ecosystem service potential for Wild Land Areas based on the capacity for different habitat types to deliver a range of ecosystem services. This approach to wild land assessments supplemented an in-depth analysis of information collected in a number of case studies (see 2.3, below). The information has been presented both in tabular form and spatially using the GIS maps of the Wild Land Areas.

2.3 Case studies

Case studies were undertaken in ten of the WLAs to determine what benefits and constraints are associated with wild land qualities and how these interact with their management. Each case study involved semi-structured interviews with a mixed sample of local stakeholders (target groups included land owners, NGOs, public agencies, local and National Park authorities, business and local community representatives). The interviews were followed up by an online participatory mapping exercise where stakeholders were asked to identify areas within each of the case study WLAs that are most important for ecosystem service provision. The case studies were selected to capture the variety of locations and characteristics of the 42 Wild Land Areas. Although the majority of Wild Land Areas are located in the central and north-west Highlands there are a number of other areas which warranted inclusion as case studies due to their location either on islands or as isolated patches within larger areas of non-wild land, such as those areas south of the Highland Boundary Fault. The relative isolation of these Wild Land Areas may have important influences on benefits they provide.

[1] http://www.snh.gov.uk/about-scotlands-nature/scotlands-biodiversity/an-ecosystems-approach/

For example, are the biodiversity benefits associated with these small and less connected areas reduced due to lower wildness of the surrounding landscape and habitats; are the island areas too remote to provide visitor benefits; are isolated mainland sites (e.g. Merrick, Talla-Hart Fell, Waterhead Moor) not perceived as wild land in the same sense as other areas? These isolated Wild Land Areas are also relatively small in comparison to the Highland areas.

Further criteria for case study selection included the nature of ownership and management of Wild Land Areas. Ownership of the areas includes public sector landowners (e.g. SNH, Forestry Commission Scotland), private estates, community trusts (e.g. Assynt Foundation, Assynt Crofters Trust), and NGOs (e.g. John Muir Trust, RSPB, National Trust for Scotland). These different owners may be managing the areas for different purposes such as active conservation, crofting or sporting purposes or may be utilising very low intensity management. Their management objectives can have a key influence on the flow of different benefits from the Wild Land Areas.

The ecosystem assessment framework developed in the second task was used to structure data collection from case study participants. In each case study, the views and opinions of different people in the 'land management hierarchy' were taken into account. Key respondents included: land owners; land managers; local community and business representatives; and local agency/area officers.

3. UPDATE OF EXISTING ESTIMATES OF WILD LAND BENEFITS

3.1 Background

In 2006, CMS and SRUC conducted the SNH funded study, 'A review of the benefits and opportunities attributed to Scotland's landscapes of wild character' (McMorran *et al*., 2006). Using existing data sources, that review estimated the impact of tourism visits and visitor spending in areas associated with wild landscapes to be between £411 and £751 million in 2003 and that up to 20,600 full-time equivalent jobs may be supported. Assessment of the social and cultural benefits of wild landscapes (including health, educational, and social benefits such as youth engagement[2] and conflict resolution) was more difficult to quantify due to a lack of relevant data, although evidence from overseas indicated that where related activities did occur the potential benefits could be high. Wild land was also considered to hold potentially high values in terms of the ecosystem services provided, such as biodiversity, carbon storage and natural flood defences. These benefits were not quantified by McMorran *et al*. (2006), but we develop an approach to mapping their potential supply in Section 4 of this study.

It is important to emphasise that the McMorran *et al*. (2006) study related to landscapes of wild character rather than specifically delineated (mapped) areas of wild land. Consequently, the estimates of benefits in the 2006 report were not intended to be precise estimates related to particular areas of land. Furthermore, the available data sources do not tend to reflect geographically specific areas (such as the Wild Land Areas). This was less problematic for the McMorran *et al*. study where inferences could be drawn using data for wider regions that might be associated with wild landscapes. This part of the report re-visits and updates the 2006 study to reflect, as far as possible, the availability of new datasets and to interpret these, where possible, with respect to mapped Wild Land Areas.

3.2 Tourism and outdoor visits in Scotland

3.2.1 Tourism

Visit Scotland (2016) report that GB residents took 12 million tourism trips (i.e. visits involving at least one night away from home) in Scotland in 2015 (including 5.8 million trips taken by Scottish residents). An additional 2.6 million trips to Scotland were taken by overseas visitors. These trips accounted for spending of £3.2 billion and £1.7 billion by UK and overseas visitors respectively. These numbers relate to the whole of the Scottish tourism market; however as scenery and landscape were cited as a motivation for visiting Scotland by 49% of respondents in Scotland's Visitor Survey (Visit Scotland, 2016), the wildness qualities of Scotland's landscapes arguably play a key role in attracting domestic and overseas visitors to the country. This applies to visitors taking part in active outdoor recreation and sporting activities such as grouse shooting and deer stalking as well as those participating in less active pastimes and who simply enjoy viewing the landscape from the roadside.

3.2.2 Outdoor visits

In 2013/14, Scotland's People and Nature Survey (SPANS) estimated that adults living in Scotland made around 396 million visits to the outdoors for leisure and recreation (TNS, 2014). The 2012 Scottish Recreation Survey estimated that visitor spend on such visits amounted to around £2.6 billion (Williamson and Stewart, 2012). Table 1 presents the

[2] Evidence on the benefits of youth engagement relates to a youth employment programme in the United States that incorporated wilderness experiences. Improvement in self-confidence, self-esteem, stress levels and improved interpersonal skills, had beneficial outcomes in terms of employment and reductions in criminality and substance abuse (Russell *et al*. 1998). We are unaware of similar evidence in Scotland.

locations of outdoor visits taken between March 2013 and February 2014 recorded by SPANS. Corresponding data from 2006 (TNS, 2008) are included for comparison[3]. The data are not detailed enough to assign trips to the Wild Land Areas as mapped by SNH (2014), instead Table 1 indicates sites of potential natural or wild character as they may contain aspects of wild land. Sites that might be considered to have natural character were visited on 291 million visits, whilst 42 million visits included sites that may be of wild character. This indicates that natural or wild sites appear more popular when compared to the corresponding numbers for 2006: 231 and 27 million visits respectively.

TNS (2014) report that 83% of all trips to outdoor destinations involve a travel distance to and from the destination of less than 10 miles and that 67% lasted less than 2 hours; only 11% of outdoor visits involved travelling more than 20 miles. Compared to the results from TNS (2005), used by McMorran *et al*. (2006), a higher number of short duration and short distance trips to the outdoors were made in 2013/14. Taking into account the four factors on which the WLAs have been mapped, a visit to an area characterised as wild land will generally be of greater distance and travel time for much of Scotland's population. Although perceived 'naturalness' or 'wildness' may be important motivations for outdoor visits, the remoteness of the Wild Land Areas would suggest that only a relatively small proportion of these visits will penetrate the most remote WLAs in particular.

Table 1. Types of location visited during outdoor visits (source: TNS, 2008 and 2014)

Destination type	2006 All destinations		2013/14 All destinations	
	% of visitors [a]	Estimated visits (m)	% of visitors [a]	Estimated visits (m)
Local park/open space	41	132.2	41	162.6
Woodland/forest (total)*	22	72.6	23	90.1
Beach [c] *	13	42.5	18	70.1
Cliff [c] *	1	3.3	1	5.0
Village	8	26.9	13	50.3
Farmland	8	25.5	11	44.4
Mountain/hill [b] **	7	22.9	7	28.6
Moorland [b] **	3	9.8	3	13.0
Sea/sea loch*	8	27.3	7	26.8
River [c] *	6	19.6	6	25.1
Canal [c]	4	13	2	7.6
Loch*	9	28.8	4	16.9
Wildlife area/nature reserve*	6	19.7	4	15.3
Total natural character		231.3		290.9
Total wild character		26.9		41.6

[a] Multiple responses possible, therefore percentages may not equal 100%
[b] TNS (2008) reports one number for the categories: beach & cliff, mountain/hill & moorland, and river & canal. SNH (pers comm) have provided breakdowns for the percentage of visiors and estimated visits for these categories; these differ from the TNS (2008) joint values as some visits may include both of the constituent parts
* may contain landscape of natural character
** may contain landscape of wild character

McMorran *et al.* (2006) considered three types of activities as potentially involving wild landscapes: hillwalking/mountaineering, wildlife watching and bird watching. TNS (2008) report that these activities were undertaken on 4%, 4% and 3% of trips respectively in 2006. In 2013/14, 2%, 3% and 2% of outdoor visits made by adults living in Scotland involved

[3] McMorran *et al* (2006) reported data from 2003/4 (TNS, 2005), however this was collected on a different basis and is not directly comparable to later years.

these activities respectively (TNS, 2014). As respondents to both the Scottish Recreation Survey and SPANS (TNS, 2008 and 2014) indicate a combination of activities undertaken and sites visited during their last trips an estimate of the value of an outdoor trip to areas with wild land characteristics cannot be made based on these data.

3.2.3 Hillwalking and mountaineering

Ninety four percent of Scotland's Munros and 78% of its Corbetts are located within the Wild Land Areas (see Figure 2) and it is reasonable to conclude that the benefits of participation in mountaineering and hillwalking can be largely attributed to the Wild Land Areas or areas with strong wild characteristics. McMorran *et al*. (2006) used mountaineering and hill-walking visitor survey data from George Street Research and Jones Economics (2004) combined with overall visitation data (Visit Scotland, 2003) to estimate that hillwalking and mountaineering in the Highlands and Islands Enterprise area accounted for 600,000 visitors and expenditure of £196.8m. We have been unable to find updated figures specific to mountaineering and hill-walking; these activities are also typically included alongside low-level walks in tourism surveys. Consequently, it is difficult to identify the current level of participation in hillwalking and mountaineering in Scotland. However, as a proxy indicator, the number of mountain rescue call outs in Scotland (Scottish Mountain Rescue, 2014) has followed an upwards trend since 2001 (see Figure 3). Mountain rescue call-outs have previously been used as a proxy indicator of participation rates by Hanley *et al*., (2000). Although only indicative of changes in participation rates, the number of call outs for mountaineering activities (including climbing and hillwalking) rose by 20% between 2003 and 2013; this reflects a similar increase of 19% noted by George Street Research and Jones Economics (2004) between 1996 and 2003.

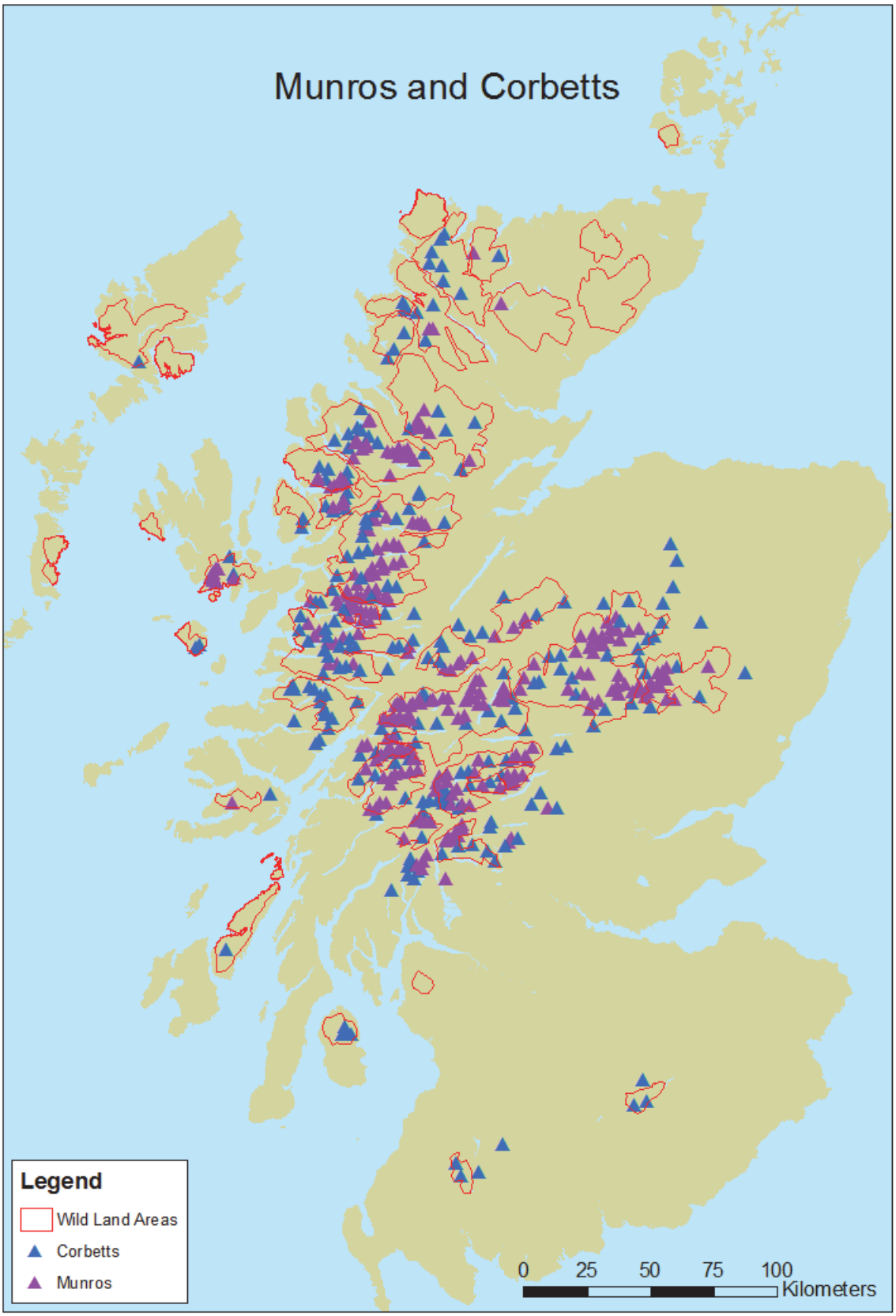
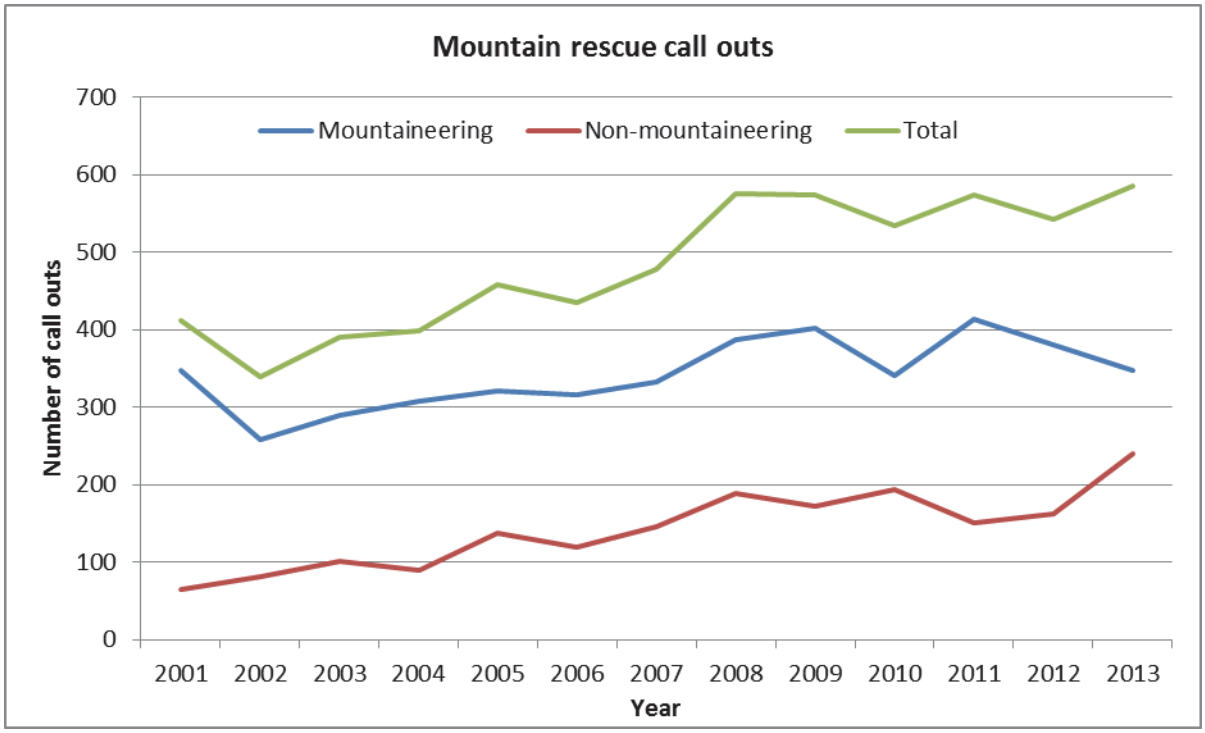


Figure 2. Munros and Corbetts in WLAs



Mountaineering: incidents involving hillwalkers, climbers and scramblers
Non-mountaineering: snow and water sports, mountain biking and missing person searches

Figure 3. Mountain rescue call outs in Scotland 2001-2013 (source: Scottish Mountain Rescue, 2014)

3.2.4 Mountain biking

Cycling as a whole accounted for an estimated 29.6 million outdoor visits by people living in Scotland in 2014 (TNS, 2014). Mountain biking can be specifically associated with areas with wildness qualities. Ekos (2009) estimated that there were 736,000 mountain biking trips to 'wilderness' areas in Scotland compared to 592,000 trips to purpose built mountain biking centres, i.e. 55% of trips are associated with 'wilder' or more 'natural' locations. Ekos (2009) also estimate total expenditure of £46.5m from trips where mountain biking was the primary purpose; multipurpose trips that include mountain biking were associated with expenditure of £119m. These expenditure figures were associated with employment impacts of 1,360 and 3,470 FTEs respectively[4]. Precisely apportioning this expenditure between different types of mountain bike trip is difficult due to likely difference in trip profile (distance travelled, overnight stays, food, equipment hire etc.). We also do not know how 'wilderness' trips correspond to wild land qualities as related to the Wild Land Areas; such trips may simply reflect an alternative classification of trip type in contrast to more formal built centres. More recent research by the Centre for Recreation and Tourism Research (2013) estimated that expenditure on mountain bike trips increased by between £5.5m and £8m from 2009 and 2012, and potential growth for the following 5 years could be between £14m and £26m.

3.2.5 Outdoor events

There are a number of distinct outdoor events involving hill-walking and running and mountain biking that can be linked to areas with wilderness qualities. For example, the Great Wilderness Challenge[5] walking and running event uses routes through the Fisherfield – Letterewe – Fannichs WLA (no. 28 in Figure 1). The Highland Cross[6] duathlon (running and

[4] FTEs: full-time equivalent jobs, will include seasonal and part-time employment
[5] http://www.greatwildernesschallenge.info/index.asp
[6] http://www.highlandcross.co.uk/index.htm

cycling) crosses the Central Highlands WLA (no. 24 in Figure 1). These events can attract large numbers of participants to local areas: the Great Wilderness Challenge attracts around 500 participants and the Highland Cross has 795 entrants. As well as the economic impacts of local spending on accommodation, food and drink these events have a strong charity fundraising aspect accounting for £3.4m (Great Wilderness Challenge since 1986) and £4.2m (Highland Cross from 1983 to 2015). In addition there are a number of other events, such as mountain marathons, that can be linked to wildness character which will create localised economic benefits.

3.2.6 Wildlife and nature based tourism

Bryden *et al*. (2010) estimated the economic impact of nature based visits and tourism in Scotland, related to a number of different activities, not all of which can be wholly or partially attributed to wild land qualities. However this remains a useful indication of the scale of economic impact from nature based visits and tourism. Overall nature based activities were estimated to have an economic impact of £1.4bn in expenditure and 39,000 full time equivalent jobs (FTEs). The impacts of different activity types are summarised in Table 2 and we also discuss the evidence around some of these activities in more detail in the following sub-sections.

Table 2. Economic impact of nature based tourism activities (source Bryden et al., 2010)

Activity/Interest	Economic Impact (£m)	Employment Impact (FTEs)
Wildlife Watching*	117.3	3,351
Field Sports*	136.3	3,893
Walking/Mountaineering*	533.1	15,231
Snow Sports*	2.1	60
Cycling*	71.6	2,045
Water Sports	25.6	731
Horse Riding	1.7	49
Adventure Activities (where not included elsewhere)	50.4	1,440
Conservation Work*	7.7	220
Other Specialist Interests (e.g. geology, botany)*	2.4	69
Scenery*	419.6	11,989
Totals	1,367.8	39,078

* May be associated with wild land qualities

In 2010 the International Centre for Tourism and Hospitality Research of Bournemouth University conducted a study into the economic impact of wildlife tourism in Scotland commissioned by Scottish Government[7] (ICTHR, 2010). For the purpose of the study they defined wildlife tourism as:

> *'Tourism with as its primary purpose the viewing, studying and/or enjoying of Scottish wildlife (animals, plants and other organisms). It excludes activities where the interaction with wildlife is incidental to the experience and consumptive forms of wildlife tourism'.*

The quantitative results of this study are based on postal and on-site surveys of tourists and businesses, with tourists defined as those visitors who make a trip involving one or more nights away from home. Respondents who indicated 'to see wildlife' as being the main motivation for their visit were classified as wildlife visitors. In addition, respondents who selected different combinations of answers were also classified as wildlife visitors.

[7] www.scotland.gov.uk/socialresearch

The study estimates a net economic impact of wildlife tourism of £65 million, supporting 2,763 FTE jobs in Scotland. Three groups of wildlife visitors are identified based on the length of a trip (day trip or multi day trip) and their country of residence (domestic or overseas): domestic day visitors, domestic wildlife tourists and overseas wildlife tourists.

Table 3 summarises some of the results from the report. In total 1.12 million trips are made to Scotland each year for the primary purpose of viewing wildlife, involving visitor spend of £276 million. Domestic wildlife tourists make 630,000 trips and account for over £208 million of expenditure, 75% of all wildlife tourism expenditure. Of all domestic tourism trips to Scotland, 5.2% are primarily motivated by wildlife and these trips account for 7.4% of all domestic tourism expenditure in Scotland.

Table 3. Summary of results for Wildlife Tourism (source: ICTHR, 2010)

Visitor type	Trips (m)	Nights (m)	Total expenditures (£m)	Number of wildlife trips as a proportion of 2008 total tourism trips (%)	Expenditure on wildlife trips as a proportion of 2008 total tourism expenditure (%)
Domestic tourists	0.63	2.8	208	5.2	7.4
Day visitors	0.41	N/A	14	N/A	N/A
Overseas tourists	0.08	0.72	54	3.1	4.4
Total	1.12	N/A	276	N/A	N/A

ICTHR (2010) also identifies three categories of wildlife tourism according to geographical characteristics: terrestrial wildlife tourism, marine wildlife tourism and coastal wildlife tourism. While marine wildlife tourism has less relevance to Wild Land Areas, the on-shore scenic backdrop will nevertheless contribute positively to the visitor's experience. These categories respectively are estimated to account for 48% (+/- 25%), 17% (+/- 19%) and 35% (+/- 24%) of total wildlife domestic tourist trips. Table 4 shows the shares of these categories in total wildlife tourism and the expenditures they generate. Terrestrial wildlife tourism has the highest net economic impact, followed by coastal and marine wildlife tourism. Marine wildlife tourism involves relatively more overnight stays. The net economic impact figures represent the true additionality of wildlife tourism: visitors to surveyed wildlife sites were asked what they would have done instead of visiting that site; alternative spending that would have occurred outside Scotland was considered to be additional. For example, if survey respondents answered that they would have visited another similar site then there is no additional economic benefit associated with the site they did visit.

Table 4. Distribution of Wildlife Tourism by Type (source: ICTHR, 2010)

Visit location	Trips %	Nights %	Spend (£m)	Net economic impact (£m)	Net economic impact (FTE jobs)
Terrestrial	43	41	113	27	1,136
Marine	21	23	63	15	633
Coastal	36	36	100	24	995
Total	100	100	277	65	2,763

The 'Highlands and Islands' region attracts most wildlife tourism in Scotland (ICTHR, 2010). This region is visited by 50% of wildlife tourists, spending £124 million in the area (see Table 5. The 'West Coast & Islands, Loch Lomond & Trossachs' is the second most popular wildlife tourism destination, with £65 million in expenditure. Together these regions account for nearly three quarters of wildlife tourism visits.

Table 5. Regional Distribution of Wildlife Tourism (source: ICTHR, 2010)

Region	Trips (%)[a]	Nights (%)	Spend (£m)	Net economic impact (£m)	Net economic impact (FTE jobs)
Highlands & Islands	50	45	124	32	1,386
Aberdeenshire, Moray & Cairngorms National Park	18	11	29	7	325
Perthshire, Angus and Fife	13	5	14	3	130
West Coast & Islands, Loch Lomond & Trossachs	23	23	65	13	550
Edinburgh, Lothians & Scottish Borders	17	4	12	3	87
Glasgow, Ayrshire, Arran, Dumfries & Galloway	27	12	34	7	285
Total	149	100	276	65	2,763

[a] Some overnight tourists visit more than one area during their visit

3.3 Sporting management

3.3.1 Economic impacts of grouse moors

McMorran *et al*. (2006) reported that an economic study of Scottish grouse moors by the Fraser of Allander Institute (FAI, 2001) estimated direct and indirect employment impacts of 630 FTEs and 940 FTEs respectively; these were associated with incomes of £9.3m and £14.8m respectively. An updated study (FAI, 2010) reports direct and indirect employment of 705 FTEs and 324 FTEs with associated incomes of £9.7m and £4.4m respectively on 92 upland estates that responded to a survey. If those responses were representative of the 304 grouse shooting estates in Scotland the overall impact would be a total of 1,072 jobs, £14.5 million worth of wages and a contribution of £23.3 million to GDP. Due to the lack of a clear map of active grouse moors in Scotland we have been unable to apportion these impacts to the Wild Land Areas.

3.3.2 Wild deer management

In 2006 PACEC conducted a study commissioned by the Association of Deer Management Groups (ADMG) to assess the contribution of deer management to the Scottish economy. It looked at both the direct and indirect impacts of deer management to account for the economic value of deer management to other sectors of the economy. It reported 67,000 gun days for deer management in Scotland. The report distinguished between sport shooting of deer and deer management not for sporting purposes. PACEC (2006) suggested that a total of 2,520 FTE jobs arise from deer management in Scotland; of these, 966 FTEs are direct employment on management (840 associated with sport shooting) and 1,554 FTEs are indirect employment through, for example, the game processing sector and fencing

activities (1,440 associated with sport shooting). These figures compare with a 1999 estimate of 850 FTEs reported by McMorran *et al*. (2006) for wild deer management activities by estates.

In 2016 PACEC conducted a further study on behalf of the ADMG, Lowland Deer Network Scotland and Scottish Gamekeepers Association to assess the contribution of deer management (both for sporting and other purposes) to the Scottish economy. This study, along with other PACEC research on shooting sports and Scottish country sports tourism, suggested the total level of stalking activity in Scotland is comparable with the 2006 estimate and that expenditure is likely to have risen in line with inflation since that point. The study estimated total expenditure in 2013/14 of £140.8m. This expenditure supports around 2,500 FTE paid jobs in Scotland, also very similar to 2006. An estimated £43.1m of this expenditure is made direct by deer management businesses and organisations; the remainder is made by stalking participants away from the deer management sites (on firearms, ammunition, external hospitality, transport etc.).

The table below shows the results of the 2006 and 2016 PACEC studies. Survey methodologies and response rates were different for each survey; however, the breakdowns of expenditure are broadly comparable allowing for inflation.

Table 6. Total impacts of deer management in Scotland, 2006 vs 2016 (source: PACEC)

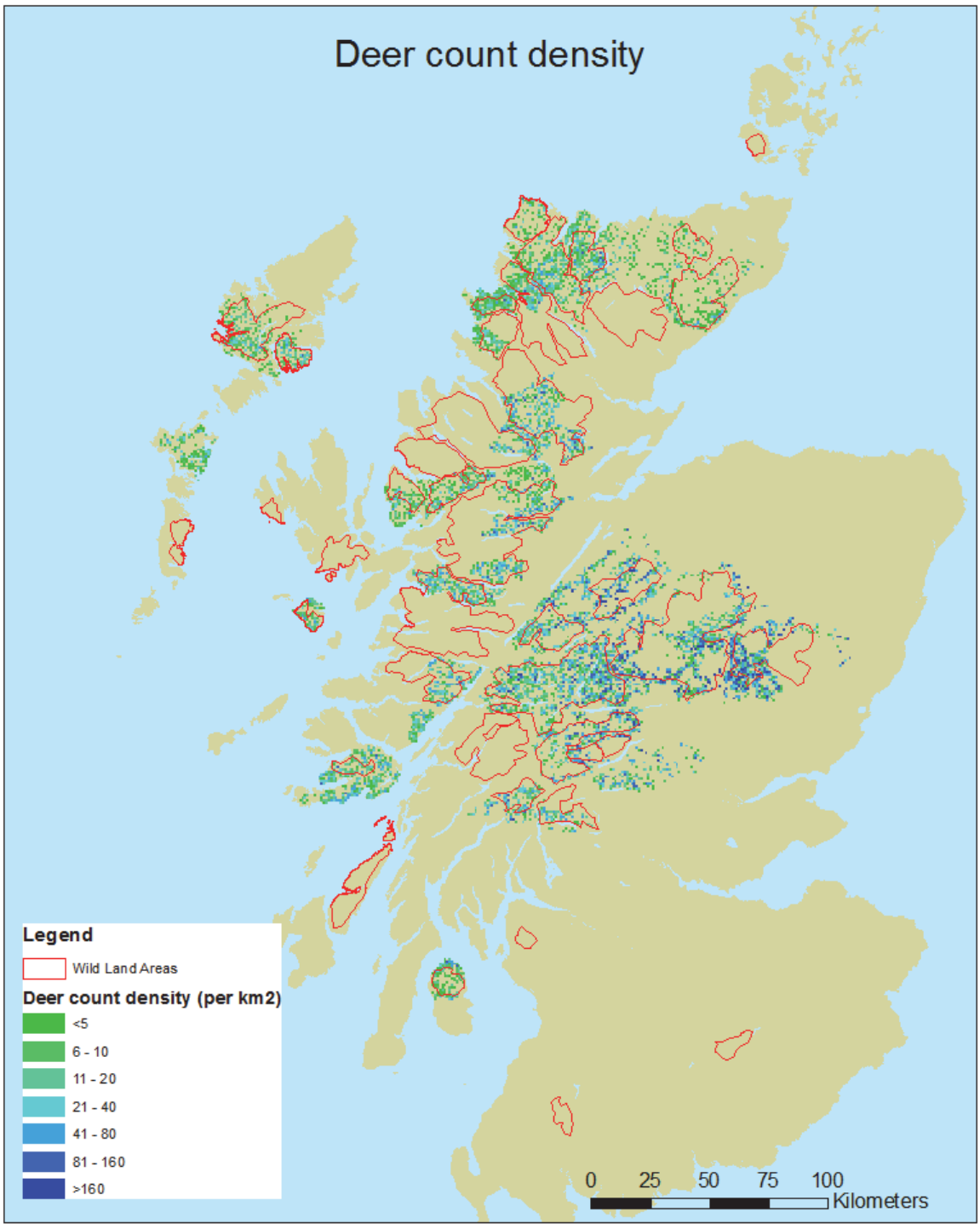
	2006	2016
Total expenditure reliant on deer management	£105.1m	£140.8m
- of which: direct staff costs	£13.6m	£15.2m
- other costs (operating, capital)	£33.5m	£44.9m
- other expenditure by stalking participants	£58.0m	£77.7m
Total FTE jobs	2,520	c2,500
- of which: direct paid FTE jobs	966	845

Note: Monetary figures are given in the prices current at the time covered by each piece of survey research (the calendar year 2004 for the study published in 2006, the financial year for the 2016 study).

Putman (2012) provides an estimate of the biodiversity costs of wild deer of approximately £250k per annum across Scotland. Using data covering the period 2005 – 2010, this figure is based on the cost to DCS/SNH of implementing deer management agreements and as such does not reflect the actual costs of damage to natural heritage. These should be balanced against the benefits of wild deer which Putman (2012) estimates as including £138m for general wildlife watching and between £107k and £113k specifically for deer watching.

Figure 4 illustrates the density of red deer per km^2 on the open hill, based on deer management group (DMG) count data which were available when this study was undertaken. This dataset very broadly reflects the distribution of both red deer and DMGs (and hence deer management), but is also strongly influenced by where counting has taken place. This should only therefore be taken as a very broad indication of the red deer range in relation to the distribution of Wild Land Areas, at a national scale, for the purpose of this report. Precisely apportioning the value of deer watching to Wild Land Areas or areas with wild land qualities is problematic as we do not know the location of viewing and movement of deer. But, based on the proportion of deer numbers counted within Wild Land Areas, and accepting the limitations of this dataset, a very broadly indicative value of £65k to £69k can be suggested. A similar apportionment to the PACEC (2006) deer management estimates gives a corresponding broad estimate of £34.6m direct and £9.6m indirect GVA and 1,537

FTEs. However, this would be an upper bound given the likelihood that management conflicts with deer would be expected to be lower in the Wild Land Areas due to the less varied land use and land cover in those areas, i.e. there is less impact on land uses such as forestry and agriculture which are mostly not present in the Wild Land Areas.



The deer density data shown here are not comprehensive and are intended solely to provide a broad indication of the distribution of red deer alongside the distribution of Wild Land Areas in a national context. (Copyright Scottish Natural Heritage Contains Ordnance Survey data © Crown copyright and database right, 2014)

Figure 4. Deer count density per km^2 and WLAs

3.4 Forestry and agriculture

Forestry is not a significant land use within Wild Land Areas with very little natural or plantation forest and woodland occurring within the Wild Land Area boundaries (see Figure 5). However, there is significant forest cover in areas adjacent to some Wild Land Areas indicating that forest management may be locally important.

Similarly, agriculture is not a significant land use associated with Wild Land Areas, although sheep in particular, and cattle, can be identified from the spatial maps of Agricultural Census data[8] (see Figure 6 for the distribution of sheep). Any grazing by these species is not a significant feature of Wild Land Areas, its presence being in very low density if at all. The agricultural output of the Wild Land Areas and the adjacent areas is likely to be very low in a national context, although it may an important element of the local economies and communities.

3.5 Summary of findings

- A number of activities can be associated with areas with wild land qualities, including outdoor visits and tourism and sporting activities such as wild deer stalking and grouse shooting.
- Outdoor visits include recreational activities such as hill walking, mountaineering and mountain biking. These contribute to local economies in areas with wild land qualities through income and employment. They can also provide important health and well-being benefits.
- The wild land qualities of Scotland's landscapes are also an important draw for tourism, including wildlife tourism, from Scotland, the rest of the UK and overseas.
- Areas with wild land qualities are also associated with wild deer management and grouse shooting. These activities create both direct and indirect employment opportunities.
- Much of the available data on activities associated with wild land qualities is not area specific and cannot be readily applied to the WLAs.

[8] The highest resolution that the agricultural census is available at is 2 by 2 km grid squares. Agricultural activities are allocated across grid squares based on the parish summaries of those activities and the number of 1 km squares that are suitable for that activity. Therefore, although the census map indicates the presence of low numbers of sheep across the WLAs (<100 sheep per grid square means <0.25 sheep per ha), they may not actually be present within the WLA area. The only grid squares where sheep are not allocated are urban, inland water and non-agricultural land.

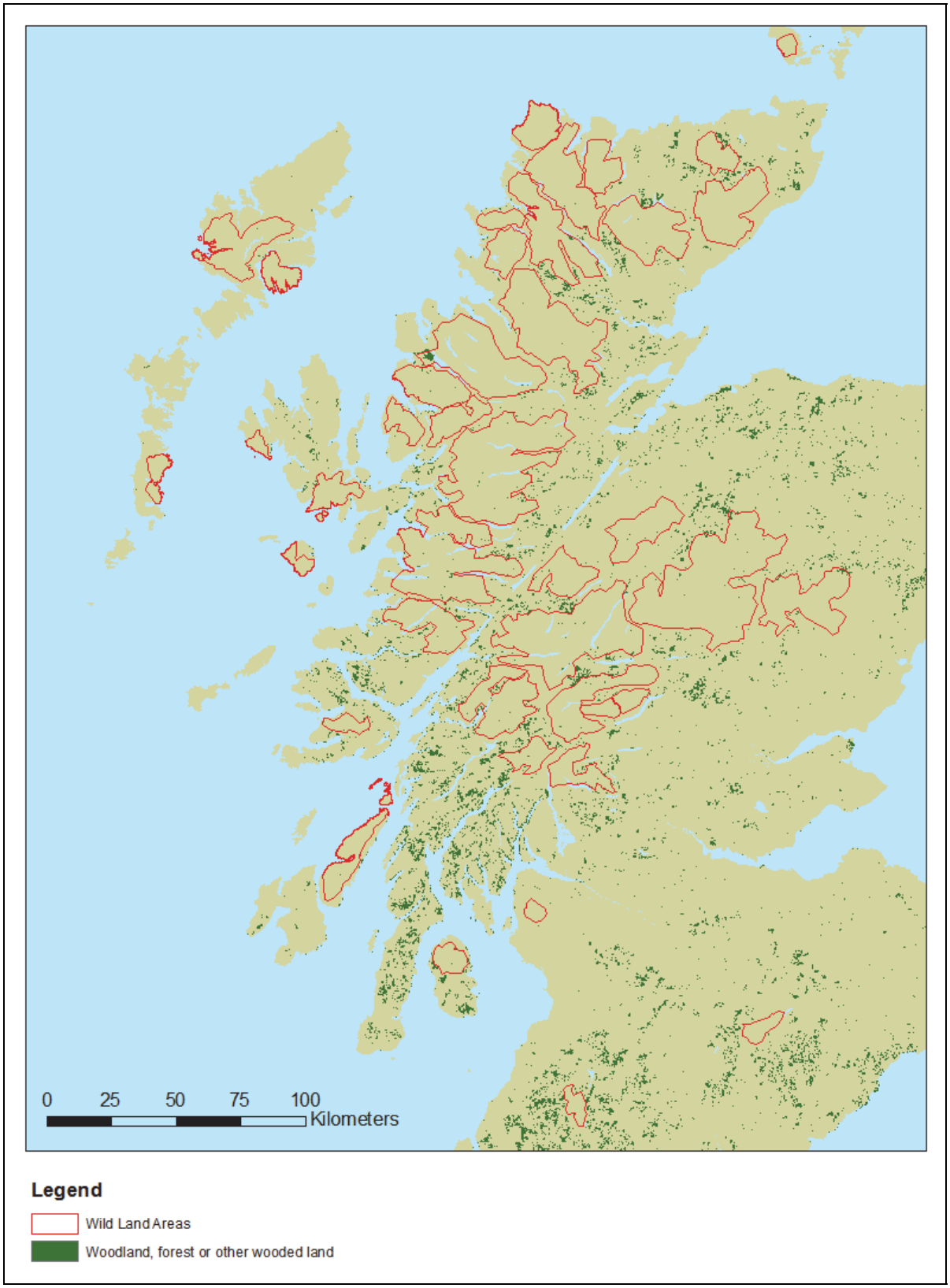
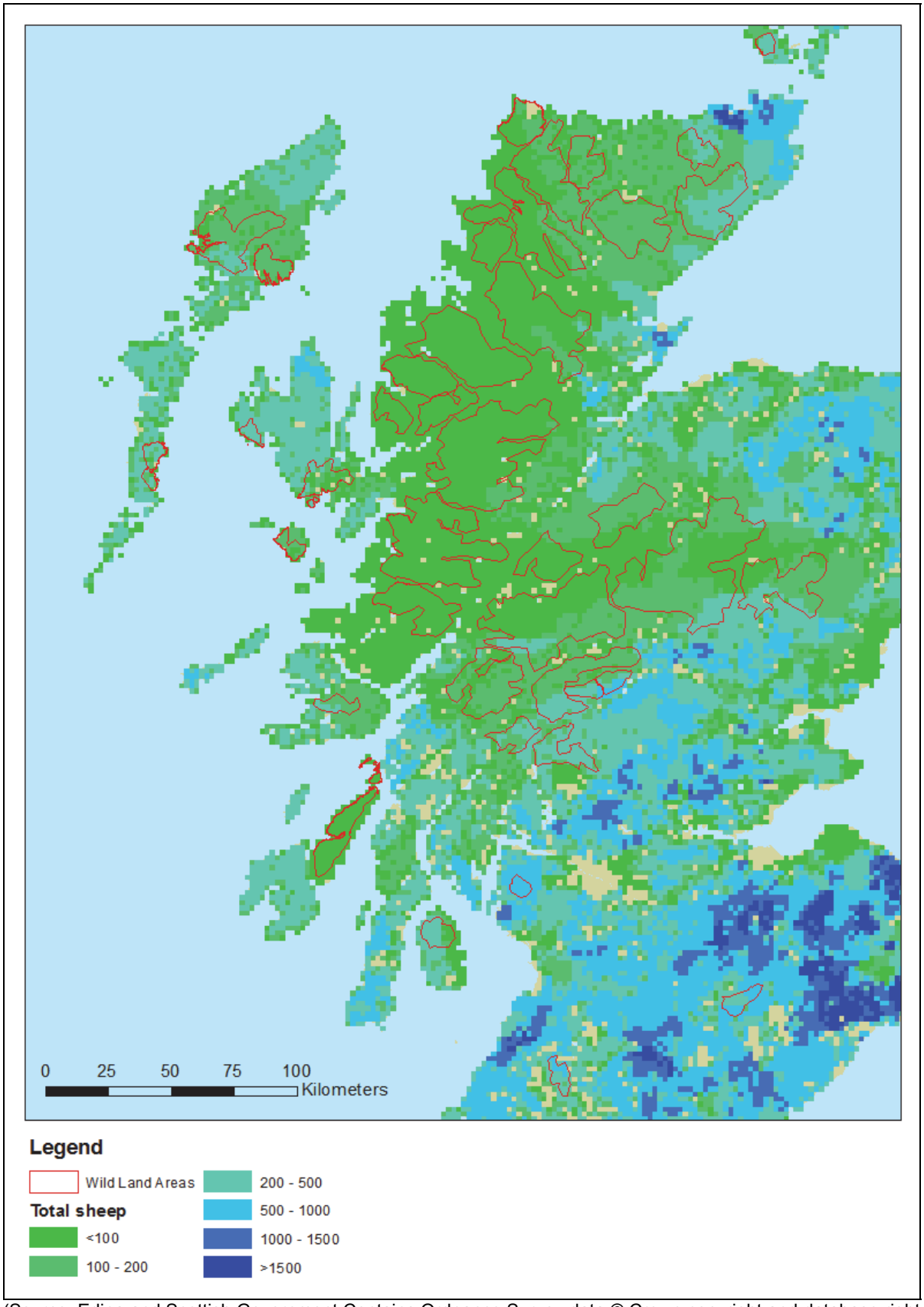


Figure 5. Woodland and forest habitats in relation to the WLAs (based on EUNIS habitats)



(Source: Edina and Scottish Government Contains Ordnance Survey data © Crown copyright and database right, 2014)

Figure 6. Total number of sheep in 2x2km grid squares

4. ECOSYSTEMS BASED ASSESSMENT OF WILD LAND AREAS

This section presents the results of our analysis of the ecosystem services that are potentially supplied by the Wild Land Areas. Our approach uses habitat maps as the basis for assessing ecosystem services as these can be linked directly to the location of the Wild Land Areas. This approach is also consistent with current initiatives such as MAES[9] and activities within Scotland, for example SNH's ongoing habitat mapping[10] and their Natural Capital Asset Index[11]. There are drawbacks with this approach as ecosytem services supply can only be indirectly inferred from habitat maps; in particular the maps in themselves do not reflect the interaction of habitat types and patches to provide services in a wider landscape context. However, there is a lack of ecosystem service mapping in Scotland, so the use of habitat maps allows us to use available data. The identified services were then used to inform the survey and mapping questions used in our case studies.

4.1 Habitats associated with Wild Land Areas

We have used the European Nature Information System (EUNIS) habitat classification[12] to examine the habitat types within the Wild Land Areas. Two approaches were used to determine the relevant habitats to consider within the assessment of Wild Land Areas:

i. The relative quantity or proportion of each habitat type within each Wild Land Area; and
ii. The quantity or proportion of each habitat type within each Wild Land Area relative to the total stock in Scotland.

The second approach allows us to identify potentially nationally significant habitat stocks even where the absolute area within any Wild Land Area is low.

ArcGIS was used to calculate the area of each EUNIS habitat class within each of the 42 Wild Land Areas and across Scotland as a whole. These data were then used to evaluate the local and national significance of the different habitat types. Table 6 presents a summary of the EUNIS habitat types for which the Wild Land Areas together represent more than 10% of the national stock. The 10% figure is arbitrary but indicates that Wild Land Areas may play a significant role in maintaining these habitats.

Alternatively, Table 7 presents the EUNIS habitats that comprise at least 5% of the area within each Wild Land Area. The 5% threshold is also arbitrary but serves to illustrate that potentially nationally significant stocks of some habitats could be excluded if the percentage area within each Wild Land Area was used as the main criterion for identifying habitats. In this case the following habitats of significance to the broader Scottish context would be excluded:

K Montane habitats
X28 Blanket bog complexes
E5.3 Pteridium aquilinum (bracken) fields
G5.6 Early-stage natural and semi-natural woodlands and regrowth

4.2 Potential supply of ecosystem services

The assessment of the habitat composition within the WLAs allows us to refine the list of ecosystem services under consideration. It also provides us with an opportunity to link with

[9] Mapping and Assessment of Ecosystems and their Services http://biodiversity.europa.eu/maes
[10] http://www.snh.gov.uk/about-scotlands-nature/habitat-map-of-scotland/
[11] http://www.snh.gov.uk/docs/B814140.pdf
[12] http://eunis.eea.europa.eu/about

SNH's ongoing update of their Natural Capital Asset Index (NCAI); this uses ecosystem services potential scores developed by Burkhard *et al*. (2014). The ecosystem services potential scores refer to the potential for a given habitat type to supply a variety of ecosystem services (each service is scored from 0 = no potential, to 5 = maximum potential). It is important to emphasise that the scores relate to potential rather than actual ecosystem services supply as they do not consider habitat condition or seasonal variation in supply (e.g. due to varying levels of biomass). The ecosystem services potential scores do not account for ecosystem services demand from any particular habitat patch, and do not reflect the relative importance or values that could be associated with different services. Despite these caveats, the approach is attractive as by linking potential ecosystem services supply to habitat types it can be easily mapped and linked to spatially defined areas such as the Wild Land Areas.

The list of ecosystem services to be considered in the ecosystem services framework and case studies was based on the Common International Classification of Ecosystem Services (CICES) to ensure consistency with other initiatives within SNH (such as the Natural Capital Asset Index) and other assessments within Scotland. CICES is comprehensive and goes beyond the list of services that would reasonably be expected to be related to wild land, either due to the nature of the habitats within the Wild Land Areas or where their 'wildness' suggests that although a service may be potentially provided there are unlikely to be recipients. Further, the upstream location of Wild Land Areas within catchments means that some services such as waste mediation are not relevant. It is possible to simplify the very detailed categories used by CICES due to the joint provision of services that in practical terms may also be difficult to differentiate. For example, the regulating services 'pollination and seed dispersal' and 'maintenance of nursery populations' together with cultural services 'enjoyment provided by wild species' might be combined into a single service of 'biodiversity' for the purpose of our case study survey in the following chapters. Taking these considerations into account, we were able to identify a shortlist of relevant ecosystem services.

Table 8 presents the EUNIS habitat types of national significance together with the relevant short-listed ecosystem services categories and their potential scores (based on Burkhard *et al*., 2014); the description of the ecosystem services potential scores is:

0 = no relevant potential;
1 = low relevant potential;
2 = relevant potential;
3 = medium relevant potential;
4 = high relevant potential;
5 = maximum relevant potential

The scoring used by Burkhard *et al* (2014) is based on 'typical' European conditions and has not been adjusted either for Scotland or the Wild Land Areas, therefore some potential scores may be under or overstated. These suggest that across the range of identified ecosystem services the key habitats are:

- C1 Surface standing waters
- C2 Surface running waters
- D1 Raised and blanket bogs
- E5 Woodland fringes and clearings and tall forb stands
- F4 Temperate shrub heathland
- X28 Blanket bog complexes

The sum of the potential scores for each broad group of ecosystem services (provisioning, regulating and cultural) supplied by habitats within the Wild Land Areas are illustrated in Figure 7 to Figure 9. The range of scores reflects both the number of ecosystem services types within each group as well as the ecosystem services potential associated with the EUNIS habitat types. For example, there are 3 types of provisioning services, 7 regulating services and 4 cultural services in the ecosystem services potential scoring matrix relevant to the Wild Land Areas. This suggests that if service scores were at the maximum potential then the total possible scores for each group would be 15, 35 and 20 for provisioning, regulating and cultural services respectively. This is an important point for the interpretation of the following maps, as the total score reflects the number of relevant services as well as potential supply. The maps also consider the ecosystem supply from all habitat types within the Wild Land Areas, not just those identified in the section 4.1, but they do not include ecosystem service potential scores for services that were not short listed in Table 8.

Provisioning services potential (Figure 7) is generally low across the Wild Land Areas with the exception of areas of surface water and the relatively small areas of forest within the Wild Land Areas. The highest sum of scores is 14 and reflects the potential role of surface water in supplying water for drinking and non-drinking purposes and wild plants and animals (e.g. fish) for food and materials. The scoring reflects potential supply rather than actual use and benefits from these services.

With respect to regulating services (Figure 8), the potential supply from the Wild Land Areas is generally high with the exception of the 'screes, inland cliffs, rock pavements and outcrops' habitat. The highest potential scores are associated with woodland and forested areas (total scores of 32 to 34), followed by raised and blanket bog (28). This reflects the role these habitats can play in supplying each of the identified regulating services. Climate change mitigation is likely to be of particular importance as this service is independent of location, i.e. it is not spatially related to a benefiting population in the same way as other regulating services, so potential supply more closely reflects actual benefits in terms of the distribution of climate mitigation across the Wild Land Areas.

The potential supply of cultural services (Figure 9) is relatively high across all habitat types within the Wild Land Areas with the lowest scores associated with 'screes, inland cliffs, rock pavements and outcrops' (9) and 'montane' (10) habitats. These lower scores allow an interesting observation to be made about the use of this approach. Although 'screes, inland cliffs, rock pavements and outcrops' may not have a high potential to provide ecosystem services when considered as a habitat in isolation, they contribute a great deal to the aesthetic appeal of the landscape. This reinforces the need to consider habitats within a broader landscape context, and may be of particular importance in relation to the contribution of wild land qualities such as ruggedness to the cultural services provided by the Wild Land Areas. Landscape level interactions are also important in the context of providing habitat networks for biodiversity conservation.

Table 6. Areas of EUNIS habitat types where more than 10% of the national stock lies within Wild Land Areas (areas in ha)

	C Inland surface waters	K Montane habitats	D1 Raised and blanket bogs	F4 Temperate shrub heathland	K1 Montane vegetation	X28 Blanket bog complexes	E5.3 Pteridium aquilinum fields	F4.1 Wet heaths	F4.2 Dry heaths	G5.6 Early-stage natural and semi-natural woodlands and regrowth	H2/H3 Screes, inland cliffs, rock pavements and outcrops	**Total (across all habitats)**
1. Merrick	274.2		940.2	895.5	711.4	5.2	167.6	2662.5		0.0	505.0	**8176**
2. Talla - Hart fell	79.4		2380.5	418.1	1568.6				51.2	27.7	249.3	**9335**
3. North Arran	158.3	142.5	2017.8	5365.5	3378.6	24.6				1.8		**11751**
4. Waterhead Moor - Muirshiel	19.6		3523.2	1030.2								**5016**
5. Jura, Scarba, Lunga and Garvellachs	825.4		3895.1	19953.3	714.0		831.0		23.9	1.5	453.4	**27816**
6. Ben Lui	379.2		775.9	7291.6	2668.7		264.6			143.7	46.8	**14497**
7. Ben More - Ben Ledi	388.7	19.7	999.9	9621.5	3890.5		888.5		221.7	412.7	2.5	**21213**
8. Ben More, Mull	41.8		673.7	5079.7	2238.1				151.0		116.1	**8720**
9. Loch Etive mountains	621.1	1080.3	2526.4	25786.5	8537.0				174.0	711.3	922.4	**50151**
10. Breadalbane - Schiehallion	1149.2	667.5	5207.6	10361.6	15384.4			134.7	313.2	647.9	421.5	**44840**
11. Lyon - Lochay	99.1	322.5	302.3	1543.8	3544.0			0.2	125.0	21.5	13.6	**7297**
12. Ben Lawers	49.6	137.4	882.0	1073.0	2894.8				349.8		55.7	**8143**
13. Moidart - Ardgour	1777.0		544.6	22665.6	4117.9		129.4	1017.1	205.4	273.8	608.3	**37355**
14. Rannoch - Nevis - Mamores - Alder	7169.1	237.5	22186.9	53476.2	21402.9	19.2		747.1	2371.7	978.2	2726.5	**118042**
15. Cairngorms	1884.8	2744.0	44639.5	37654.3	36477.3	1.0	29.4	184.6	22647.1	95.9	1253.4	**157224**
16. Lochnagar - Mount Keen	792.8		17587.2	5770.0	3136.0			123.9	23576.4	46.0	202.4	**53582**
17. Rum	93.6	7.6		166.2	1459.0			3920.4			777.8	**6957**
18. Kinlochhourn - Knoydart - Morar	3803.9	0.6	3070.7	66342.8	17041.5		142.0	462.2	923.3	387.3	349.9	**105281**
19. Braeroy - Glenshirra - Creag Meagaidh	232.0	211.1	5015.4	10181.6	7782.3			3.9	208.1	14.1	179.4	**26460**
20. Monadhliath	307.2		17331.7	7139.6	5792.3		11.4	49.0	2224.7			**33978**
21. South Uist hills	310.2		2909.8	176.0	1233.8		37.9	4913.8	121.5	52.1	15.4	**9945**
22. Duirinish	38.6		3475.3	147.4	35.1			23.8	98.9		79.5	**4467**
23. Cuillin	401.5		2774.1	85.3	469.9			6341.2	884.5	2.4	6988.7	**18325**
24. Central Highlands	4525.8	559.3	12811.1	68374.6	32253.4		77.1	2168.7	724.3	572.6	458.7	**132703**
25. Applecross	587.3		157.7	1067.8	1949.0	1.5		9303.9		156.0	411.4	**13661**
26. Coulin & Ledgowan Forest	463.1		1461.6	6937.7	3920.7			7043.1		89.2	414.4	**20867**

	C Inland surface waters	K Montane habitats	D1 Raised and blanket bogs	F4 Temperate shrub heathland	K1 Montane vegetation	X28 Blanket bog complexes	E5.3 Pteridium aquilinum fields	F4.1 Wet heaths	F4.2 Dry heaths	G5.6 Early-stage natural and semi-natural woodlands and regrowth	H2/H3 Screes, inland cliffs, rock pavements and outcrops	**Total (across all habitats)**
27. Flowerdale - Shieldaig - Torridon	1212.3		1779.7	2582.4	5299.6	67.5		18320.9		463.8	958.1	**31782**
28. Fisherfield - Letterewe - Fannichs	6548.5		12638.5	16346.7	13289.3	19.8		26960.6	148.6	375.1	1038.8	**80441**
29. Rhidorroch - Beinn Dearg - Ben Wyvis	2330.4	414.9	28936.4	25244.7	10353.6	0.8		18127.3	1168.8	455.4	1015.6	**90467**
30. Harris - Uig hills	4843.9		17405.6	2151.2	3161.5	501.0		15206.3		21.1	1603.2	**45271**
31. Eisgein	387.1		3583.3	1067.8	640.4	32.7		8414.3			23.9	**14197**
32. Inverpolly - Glencanisp	2165.3		1459.9	1583.4	430.9			13905.9		46.7	532.7	**20544**
33. Quinag	1096.6		151.7	296.6	259.5	15.2		7682.4		222.4	406.2	**10446**
34. Reay - Cassley	2296.3		16174.6	12359.9	1084.2	648.1		19806.3		396.2	2053.1	**55998**
35. Ben Klibreck - Armine Forest	1400.7	291.6	26208.0	21652.2	394.4	449.7		237.7		303.7	3.2	**53023**
36. Causeymire -Knockfin Flows	1084.9		33368.8	13680.9	229.5	1994.0		66.7	19.7	25.8	118.2	**51404**
37. Foinaven - Ben Hee	2390.8		8869.3	13815.6	1240.1	1956.7		25029.3		35.7	2969.0	**56907**
38. Ben Hope - Ben Loyal	921.3		6912.4	3109.3	224.1	477.6	8.0	9751.3		105.1	327.6	**22085**
39. East Halladale Flows	744.9		12133.3	1447.8		706.1	0.5	671.4		5.7		**15899**
40. Cape Wrath	676.1		12521.3	6971.5	343.7	668.0		503.3			127.1	**22106**
41. Hoy	78.6		923.4	2951.3	380.7	153.3		369.3	20.8		44.5	**4990**
42. Ronas Hill & North Roe	302.7		878.4	382.9	1469.1			479.7	376.8		96.5	**4109**
Total	**54953**	**6837**	**342035**	**494249**	**221402**	**7742**	**2587**	**204633**	**57130**	**7092**	**28570**	**1535471**
Scotland	**249678**	**7746**	**957193**	**1273191**	**279297**	**14845**	**22269**	**418847**	**301309**	**57673**	**40136**	**7987189**
% of national stock within WLAs	**22**	**88**	**36**	**39**	**79**	**52**	**12**	**49**	**19**	**12**	**71**	**19**

Table 7. EUNIS habitats accounting for at least 5% of the area of individual Wild Land Areas

	C Inland surface waters	D1 Raised and blanket bogs	E4 Alpine, subalpine and extensive grasslands	F4 Temperate shrub heathland	K1 Montane vegetation	E4.3 Acid alpine, subalpine and extensive grassland	F4.1 Wet heaths	F4.2 Dry heaths	H2/H3 Screes, inland cliffs, rock pavements and outcrops	**Total % of WLA (habitats covering at least 5%)**
1. Merrick		12		11	9	24	33		6	**94**
2. Talla - Hart fell		26			17	48				**90**
3. North Arran		17		46	29					**92**
4. Waterhead Moor - Muirshiel		70	5	21						**96**
5. Jura, Scarba Lunga and Garvellachs		14		72						**86**
6. Ben Lui		5		50	18	17				**91**
7. Ben More - Ben Ledi				45	18	15				**79**
8. Ben More, Mull		8		58	26					**92**
9. Loch Etive mountains		5		51	17	16				**90**
10. Breadalbane - Schiehallion		12		23	34	20				**89**
11. Lyon - Lochay				21	49	13				**83**
12. Ben Lawers		11		13	36	27				**87**
13. Moidart - Ardgour				61	11	8				**80**
14. Rannoch - Nevis - Mamores - Alder	6	19		45	18					**88**
15. Cairngorms		28		24	23			14		**90**
16. Lochnagar - Mount Keen		33		11	6			44		**93**
17. Rum			6		21		56		11	**94**
18. Kinlochhourn - Knoydart - Morar				63	16					**79**
19. Braeroy - Glenshirra - Creag Meagaidh		19		38	29	5				**92**
20. Monadhliath		51		21	17			7		**96**
21. South Uist hills		29			12		49			**91**
22. Duirinish		78	7			5				**90**
23. Cuillin		15					35		38	**88**
24. Central Highlands		10		52	24					**85**
25. Applecross				8	14		68			**90**
26. Coulin & Ledgowan Forest		7		33	19		34			**93**
27. Flowerdale - Shieldaig - Torridon		6		8	17		58			**88**
28. Fisherfield - Letterewe - Fannichs	8	16		20	17		34			**94**
29. Rhidorroch - Beinn Dearg - Ben Wyvis		32		28	11		20			**91**
30. Harris - Uig hills	11	38			7		34			**90**
31. Eisgein		25		8			59			**92**
32. Inverpolly - Glencanisp	11	7		8			68			**93**
33. Quinag	10						74			**84**
34. Reay - Cassley		29		22			35			**86**
35. Ben Klibreck - Armine Forest		49		41						**90**
36. Causeymire -Knockfin Flows		65		27						**92**
37. Foinaven - Ben Hee		16		24			44		5	**89**
38. Ben Hope - Ben Loyal		31		14			44			**90**
39. East Halladale Flows		76		9						**85**
40. Cape Wrath		57		32						**88**
41. Hoy		19		59	8		7			**93**
42. Ronas Hill & North Roe	7	21		9	36		12	9		**95**

Table 8. Ecosystem services potential of wild land associated habitats (scores based on Burkhard et al., 2014)

Classification used by NCAI		CICES definition	C1 Surface standing waters	C2 Surface running waters	D1 Raised and blanket bogs	E4 Alpine and subalpine grasslands	E5 Woodland fringes and clearings and tall forb stands	F4 Temperate shrub heathland	H2/H3 Screes, inland cliffs, rock pavements and outcrops	K1 Montane vegetation	X28 Blanket bog complexes	K Montane habitats
Provisioning services												
1.3	Wild animals, plants and algae (and their outputs)	Game, freshwater fish (trout, eel etc.), as well as honey harvested from wild populations; Includes commercial and subsistence fishing and hunting for food	4	4	1	3	4	2	0	3	1	3
1.5	Water for drinking purposes	Collected precipitation, abstracted surface water from rivers, lakes and other open water bodies for drinking	5	5	0	0	0	0	0	0	0	0
1.9	Water for non-drinking purposes	Collected precipitation, abstracted surface water from rivers, lakes and other open water bodies for domestic use (washing, cleaning and other non-drinking use), irrigation, livestock consumption, industrial use (consumption and cooling) etc.	5	5	0	0	0	0	0	0	0	0
Regulating services												
2.1	Mediation of waste, toxins and other nuisances (by biota)	Bio-chemical detoxification/decomposition/mineralisation in land/soil, freshwater and marine systems including sediments; decomposition/detoxification of waste and toxic materials e.g. waste water cleaning, (phyto)degradation, (rhizo)degradation etc.	5	5	4	2	2	3	0	2	4	2
2.2	Mediation of waste, toxins and other nuisances (by ecosystems)	Bio-physicochemical filtration/sequestration/storage/accumulation of pollutants in land/soil, freshwater and marine ecosystems, including sediments; adsorption and binding of heavy metals and organic compounds in ecosystems (combination of biotic and abiotic factors)	5	5	4	2	2	3	0	2	4	2
2.3	Mediation of mass flows and erosion	Erosion / landslide / gravity flow protection; vegetation cover protecting/stabilising terrestrial ecosystems; vegetation on slopes also preventing avalanches (snow, rock) etc.	2	1	3	3	4	2	2	3	3	3
2.4	Mediation of liquid flows (hydrological cycle/flood protection)	Capacity of maintaining baseline flows for water supply and discharge; e.g. fostering groundwater; recharge by appropriate land coverage that captures effective rainfall; includes drought and water scarcity aspects.	5	3	4	1	1	2	1	1	4	1

	Classification used by NCAI	CICES definition	C1 Surface standing waters	C2 Surface running waters	D1 Raised and blanket bogs	E4 Alpine and subalpine grasslands	E5 Woodland fringes and clearings and tall forb stands	F4 Temperate shrub heathland	H2/H3 Screes, inland cliffs, rock pavements and outcrops	K1 Montane vegetation	X28 Blanket bog complexes	K Montane habitats
2.9	Soil formation and composition	Maintenance of bio-geochemical conditions of soils including fertility, nutrient storage, or soil structure; includes biological, chemical, physical weathering and pedogenesis	3	3	4	3	4	3	0	3	4	3
2.10	Maintenance of water's chemical condition	Maintenance / buffering of chemical composition of freshwater column and sediment to ensure favourable living conditions for biota e.g. by denitrification, re-mobilisation/re-mineralisation of phosphorous, etc.	2	3	4	2	3	3	1	2	4	2
2.11	Global, regional and micro climate regulation	Global climate regulation by greenhouse gas/carbon sequestration by terrestrial ecosystems, water columns and sediments and their biota; transport of carbon into oceans (DOCs) etc.	2	1	5	2	4	4	0	2	5	2
Cultural services												
3.1	Physical and experiential interactions	In-situ wildlife, bird watching etc. Walking, hiking, climbing, boating, leisure fishing (angling) and leisure hunting	5	4	3	2	3	4	2	2	3	2
3.2	Heritage, scientific and educational interactions	Subject matter for research, education and historic records, both on location and via other media	4	4	3	4	5	5	3	4	3	4
3.3	Aesthetic and entertainment interactions	Ex-situ viewing/experience of natural world through different media. Sense of place, artistic representations of nature	4	4	2	2	4	4	2	2	2	2
3.5	Existence and bequest	Enjoyment provided by wild species, wilderness, ecosystems, landscapes. Willingness to preserve plants, animals, ecosystems, landscapes for the experience and use of future generations; moral/ethical perspective or belief	5	4	4	2	3	3	2	2	4	2

Ecosystem services potential scores: 0 = no relevant potential; 1 = low relevant potential; 2 = relevant potential; 3 = medium relevant potential; 4 = high relevant potential; 5 = maximum relevant potential

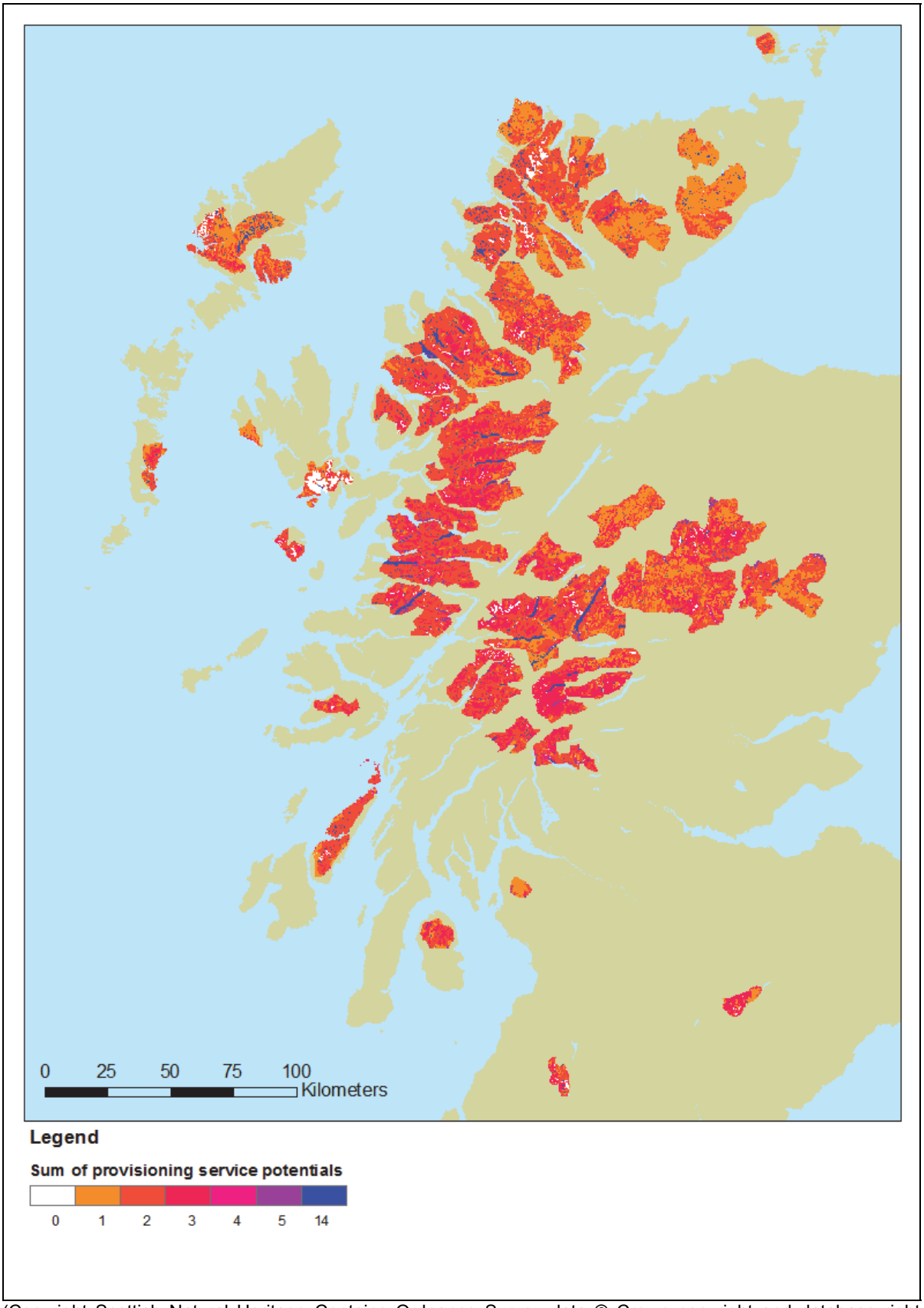


Figure 7. Sum of provisioning ecosystem service potential scores within the WLAs based on EUNIS habitats

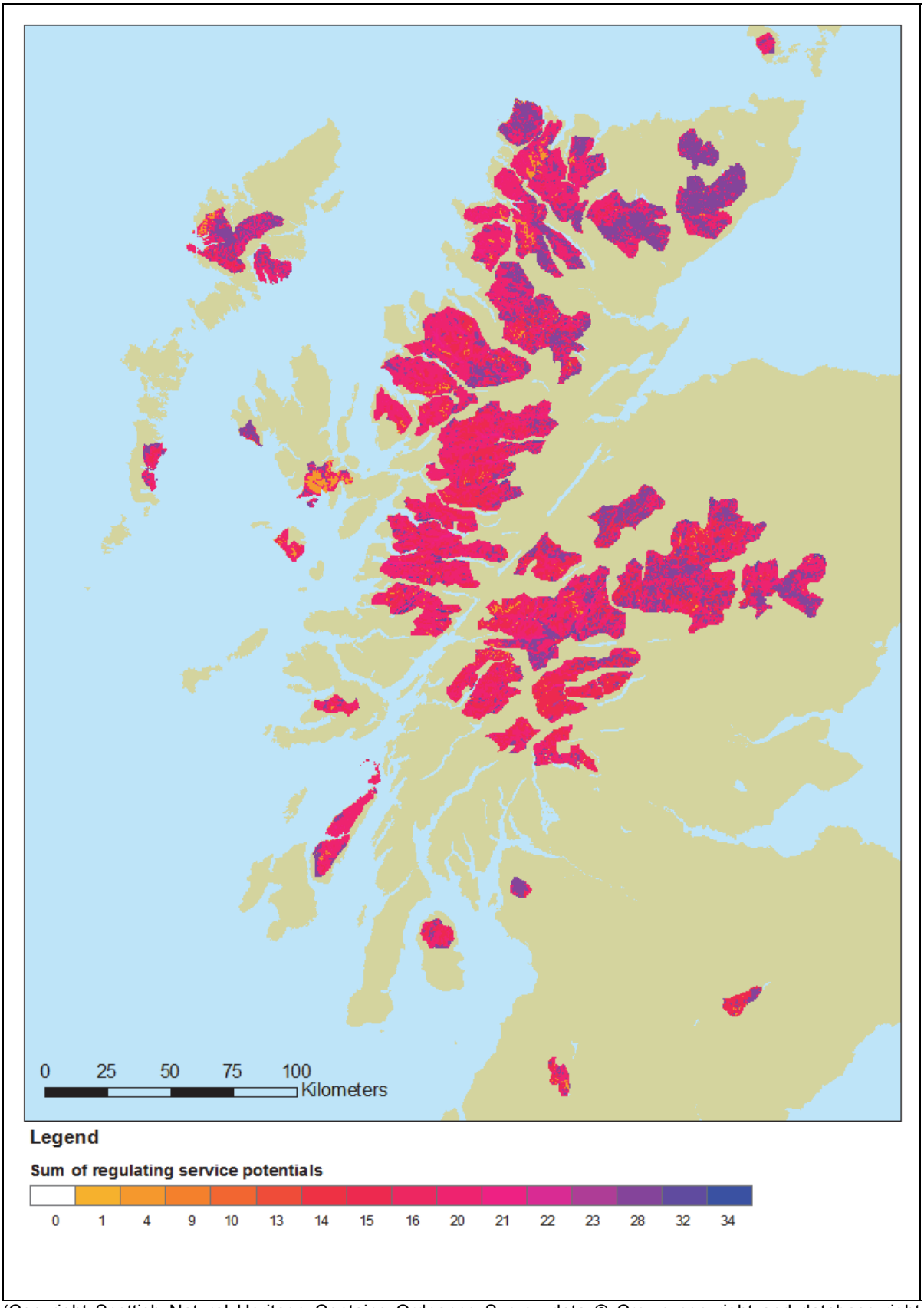


Figure 8. Sum of regulating ecosystem service potential scores within the WLAs based on EUNIS habitats

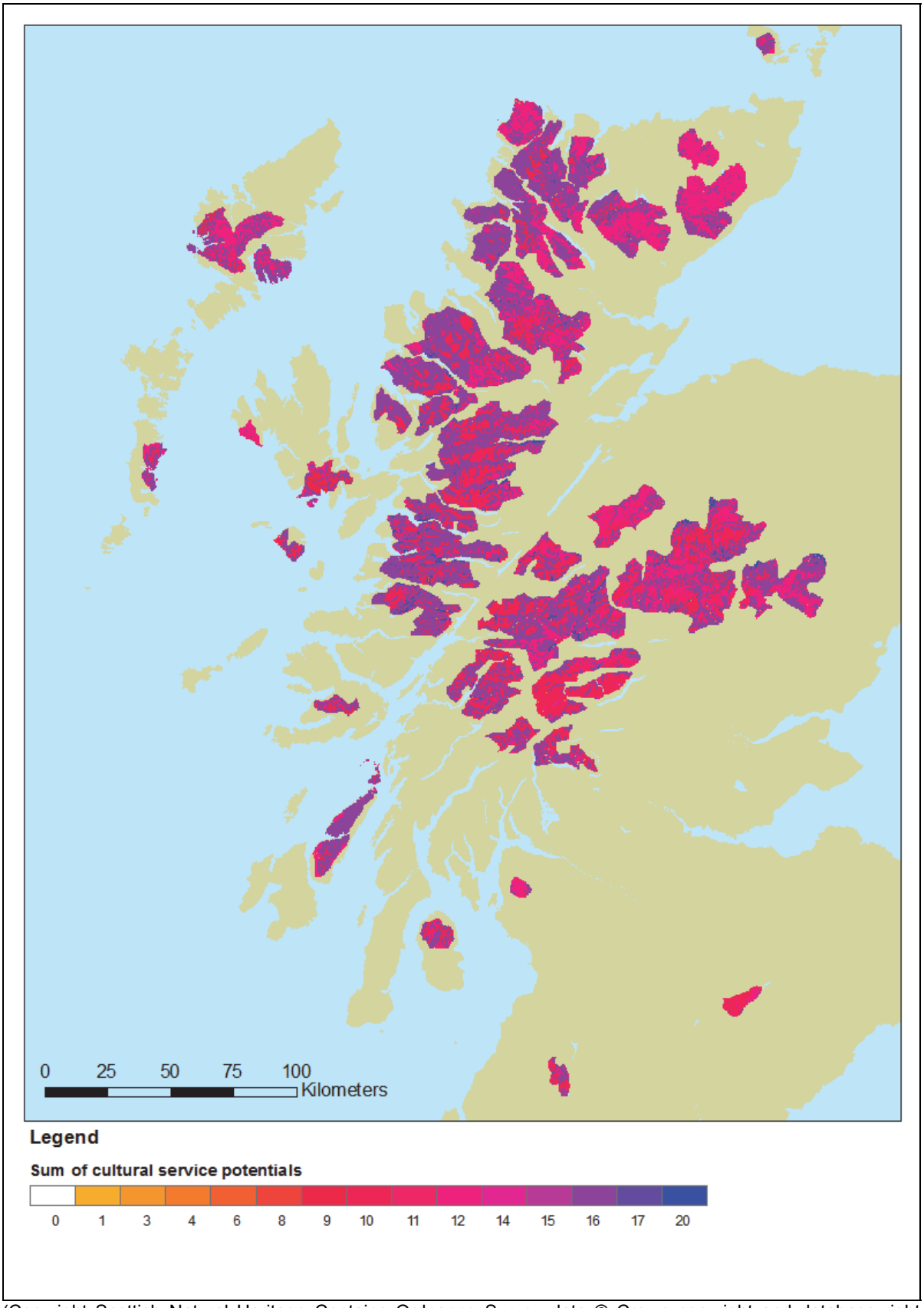


Figure 9. Sum of cultural ecosystem service potential scores within the WLAs based on EUNIS habitats

4.3 Commentary on ecosystem service supply in Wild Land Areas

In this subsection we provide a qualitative commentary on some of the ecosystem service categories identified in the preceding analysis.

Wild animals, plants and algae (and their outputs)

In many of the Wild Land Areas deer are not a significant feature, with the concentration reflecting the deer population in the surrounding areas (see Figure 4). There is a much higher density of deer found concentrated in an area centred between WLAs 14 and 15, 16, 19 and 20.

Water for drinking purposes

Watercourses and open water are found across the Wild Land Areas. However, much of the surface water resource within the Wild Land Areas is not used for potable water supply.

Mediation of mass flows and erosion, and mediation of liquid flows

These services relate to the role of vegetation cover in stabilising soils and rock to prevent landslides (mass flows) and erosion, and also to slow water flow to maintain river levels and potentially reduce flood risk. Provision of these services by Wild Land Areas largely relies on their relatively undisturbed state; risks would occur due to activities such as heavy grazing. Increased provision might be achieved through greater woodland cover; however, native woodland hardly has a presence; being found mostly on the fringes of the Wild Land Areas.

Global, regional and micro climate regulation

Peat is not a consistent or widespread feature of the montane Wild Land Areas, except 16, 20, and to a lesser extent 10, 15, 29, 34, 40. The most peat is found in the lowland Wild Land Areas of 35, 36, 39.

Physical and experiential interactions

Another consistent characteristic across the Wild Land Area set is revealed by a mapping of a Recreation Opportunity Spectrum[13] zoned on the basis of three classes based on the amount of time required to visit the WLAs from main population centres – up to half a day; half day to full day; and multiple day/overnight. All the Wild Land Areas show half day to full day zones, little of which is found outside of Wild Land Areas; some of the Wild Land Areas show large "core areas" of multiple day/overnight (14, 15, 18, 23, 24, 28, 29 and 35) with small cores in 8, 31, 34, 36 and 3; none of this core area zone is found outside of a Wild Land Area.

Heritage, scientific and educational interactions

The relative naturalness and types of habitat located in Wild Land Areas offer unique heritage and scientific opportunities. In particular, Wild Land Areas are important locations for montane habitats and montane vegetation with 88% and 79% of Scotland's national stock respectively.

[13] Recreation Opportunity Spectrums are tools designed to assess and manage the diversity of recreation opportunities based on factors such as accessibility or naturalness. For a review of ROS see: http://www.recpro.org/assets/Library/Visitor_Experience_Management/tros_lit_rev.pdf.pdf

4.4 Summary of findings

- Habitats associated with Wild Land Areas were identified with respect to both their importance within the Wild Land Areas and where Wild Land Areas represented a significant proportion of the total area of those habitats in Scotland.
- For example, the 42 Wild Land Areas collectively account for 88% of the national stock of montane habitats, 79% of montane vegetation, 52% of blanket bog complexes, 49% of wet heaths, and 71% of screes, inland cliffs and rock outcrops.
- The habitat based analysis was used to develop a short list of relevant ecosystem services provided by Wild Land Areas based on habitat types and locations.
- Scoring of the potential supply of ecosystem services was then applied to habitat maps within the Wild Land Areas.
- The potential for provisioning services is generally low within the Wild Land Areas with the exception of potential water supply from surface waters. Further analysis would be required to determine the extent to which that potential supply is utilised.
- The potential for regulating services was generally high, although concentrated in particular habitat types. Surface waters (mediation of toxins and liquid flows) and blanket bogs (carbon sequestration) have the highest potential service provision scores. The generally high level of vegetation coverage also acts to limit erosion.
- The potential for cultural service supply is relatively high across the Wild Land Areas and associated habitat types. The interaction of habitat types at landscape scale was not picked up by our analysis and could greatly enhance the cultural services provided by the Wild Land Areas, particularly with respect to wild land qualities such as ruggedness.

5. WILD LAND AREA CASE STUDIES

5.1 Case study methodology

Ten wild land case study areas were selected for analysis within the project. This selection was designed to reflect a range of Wild Land Areas which varied in scale, topography, land use/land management and location in Scotland. Locations included islands and relatively inaccessible mainland areas as well as areas in close proximity to significant population centres. The final selection of case studies is presented in Table 9 together with the rationale for inclusion; their locations are illustrated in Figure 10.

A list of potential interviewees was agreed by the project team with input from SNH. This was done by identifying key stakeholders in the area across a range of interests, i.e. land management (public and private), conservation, tourism/recreation and community representatives. For each of the ten wild land case study areas, we interviewed between 4 and 6 stakeholders (target number was 5), aiming for a balanced representation of interests. Interviews (30 – 40 mins) were done by phone; the interview schedule can be found in Appendix A. Each interviewee was sent a map image of the wild land area boundary prior the interview so that discussion could be focussed on the relevant area. Despite this, on some occasions interviewees interpreted 'wild land' to extend to neighbouring areas which resulted in some comments about more general regional benefits and constraints which have less relevance for specific Wild Land Areas, e.g. general lack of regional facilities and infrastructure. At the end of each interview, the second stage Map-Me online survey and the concept of ecosystem services mapping was explained and interviewees were encouraged to complete this as soon as possible while the discussion about wild land was fresh in their minds. There were fewer Map-Me survey responses for each case study area than interviews due to some drop-outs where respondents failed to complete the survey. The rationale and approach to the Map-Me exercise are discussed in the following section. The results reported in the case study tables in Section 6 are entirely based upon the perceptions of the interviewees.

Table 9. Final list of case study areas and rationale for inclusion

Name	Total area (ha)	Rationale
1. Merrick	8,176	Small WLA in southern uplands
3. North Arran	11,751	Island WLA close to large population
4. Waterhead Moor - Muirshiel	5,016	Small WLA close to large population
6. Ben Lui	14,497	WLA within Loch Lomond and The Trossachs National Park
14. Rannoch – Nevis – Mamores -Alder	118,042	Large WLA with some development pressures
15. Cairngorms	157,225	WLA within Cairngorms National Park
23. Cuillin	18,324	WLA partly under environmental NGO ownership (John Muir Trust)
24. Central Highlands	132,703	WLA with active environmental NGO management and some proposals for habitat management
30. Harris – Uig hills	45,270	Island WLA with extensive crofting
36. Causeymire - Knockfin Flows	51,404	WLA with extensive lowland bog/Flows

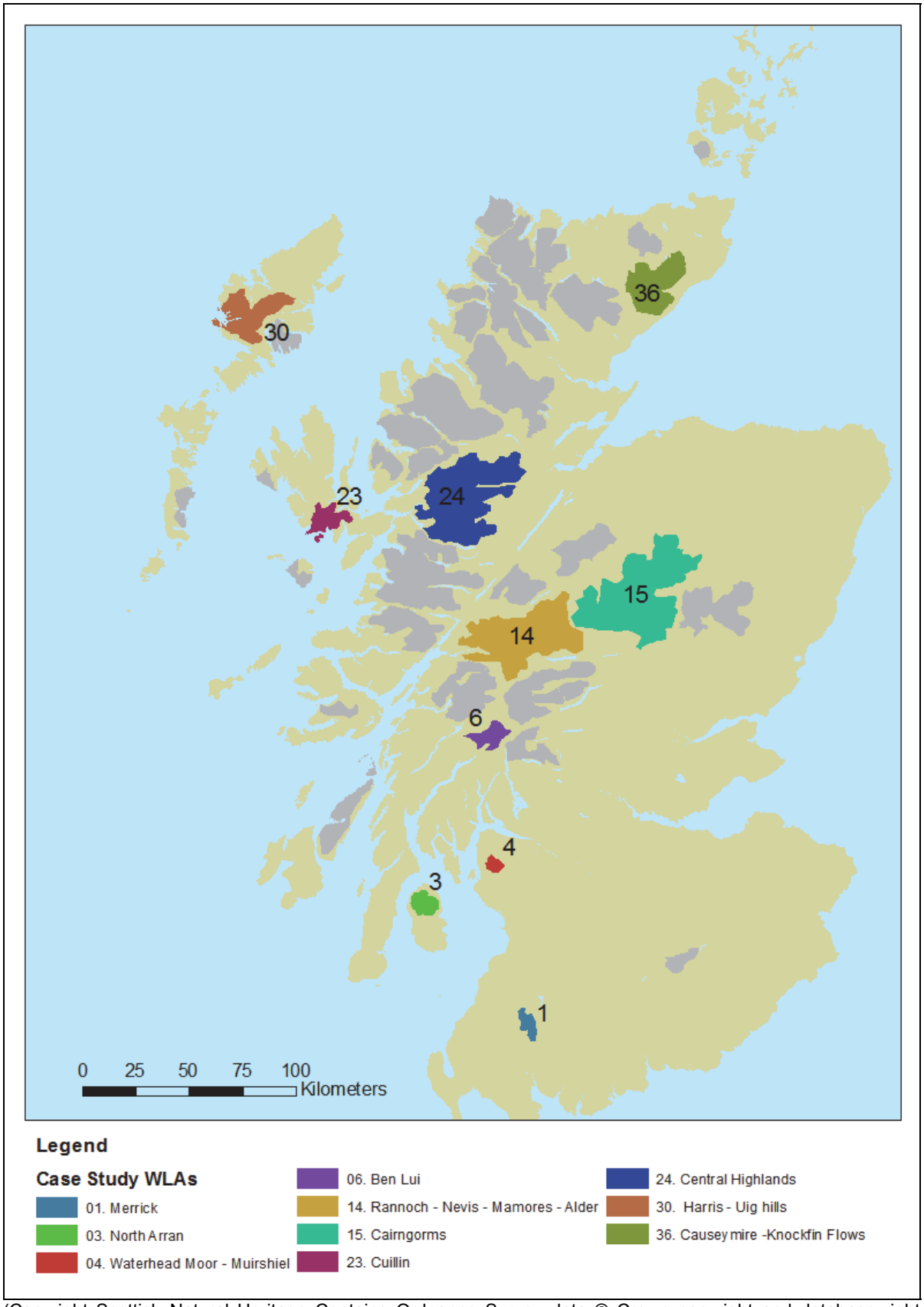


Figure 10. Location of case study Wild Land Areas

5.2 Participatory mapping

Map-Me ("Mapping Meanings") is an online Public Participation GIS (PPGIS) for the creation of online surveys involving the collection of 'vague' or fuzzy spatial data. Based upon a "spray and say" approach, Map-Me uses an 'airbrush' interface (the "Spraycan") to allow participants to "spray-paint" on to a Google Map in order to answer vague spatial questions (e.g. "Where do you think...?") without being required to artificially enforce precise boundaries (i.e. the boundaries used are gradual or fuzzy) onto their data. Users can then comment on their spray pattern in response to a number of “say” questions (e.g. “Why do you think…?”).

The Map-Me database stores the comments linked to the spray patterns so they can be queried and analysed at a later date. Data are stored within a ‘multi-point-and-attribute’ data structure whereby each individual ‘dot’ of ‘paint’ created using the airbrush (i.e. the “spray” geographical element) is stored as a discrete geographical object, and is joined to all other associated ‘dots’, as well as a variety of other demographic and contextual data, including the free-text data in which the participants may have added context to their spray patterns (i.e. the “say” contextual element). The flexibility of this data structure provides a wide variety of analytical choices for the researcher and is used here to collect spatially delimited data from land managers and other stakeholders about the environmental, social and economic benefits associated with wild land in Scotland. It is understood that people living and working in or immediately around these Wild Land Areas can offer a very well-informed view on these and other associated benefits.

In essence, the Map-Me survey and results allow for a better and more nuanced understanding of spatial patterns and variations, in this case, the environmental, social and economic benefits associated with the landscapes of selected Wild Land Areas, without having to assume that these benefits are equally spread across these areas. The maps shown in section 6 summarising case study findings show marked variations in this regard, thus clearly illustrating that there are spatial variations in users’ opinions and knowledge, which reflect the spatial patterns and variation in the benefits of interest.

6. CASE STUDY SUMMARY TABLES

In this section we present the outcomes of the case study interviews and the Map-Me exercise in tabular and map form. The presentation of the summary outputs in a common template is for ease of comparison. We present a fuller synthesis of the case study findings in a subsequent section. The results in the case study tables are based entirely on the perceptions of the interviewees. Interviewees sometimes identified facts and figures they considered important for characterising the Wild Land Areas and these are also included in the results.

The Map-Me exercise asked respondents to identify important areas for a range of ecosystem services. We have used a simplified list of ecosystem services compared to that indicated by our analysis of EUNIS habitats, reducing the original list from 14 to 7. The category of 'food provision' includes both livestock and wild game; 'water supply' includes both drinking and other uses, including the role of water as a natural habitat. We also explicitly include wildlife and habitats as a distinct category to represent biodiversity and the cultural benefits of wildlife and habitats. This was a pragmatic decision in order to minimise the burden on respondents and also reflecting the often joint provision of similar services by particular land cover types (e.g. soil erosion and water flow attenuation are typically provided together). The ecosystem services considered are listed in Table 10.

Table 10. Ecosystem services considered in the Map-Me exercise

Ecosystem Services	Example
Wildlife & habitats (biodiversity)	The diversity of plants, animals and habitats in the area. This could include emblematic species
Food provision	Production of livestock and wild harvest products such as venison and game birds
Water supply	Water supply for drinking, industrial processes (e.g. distilling), hydropower and natural habitats
Climate regulation	The capture and storage of carbon, for example in peatland and vegetation
Hazard regulation	Reducing erosion or landslides and regulating peak water flows to reduce downstream flood risks
Tourism & recreation	Visits, recreational activities e.g. walking, hunting (deer stalking and grouse shooting), wildlife watching
Cultural heritage	Preservation of the area's past and current cultural heritage. The contribution of landscape to people's aesthetic experience

Case study: Ben Lui

General information about wild land area	
Case study name	**Ben Lui**
Description of participants	*Scottish Natural Heritage (Stirling office)* *Glenfalloch Estate (private estate near Crianlarich)* *Strathfillan Community Development Trust (2 interviewees)* *Loch Lomond and the Trossachs National Park Authority (2 interviewees)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ There is great appreciation for the landscapes of Ben Lui and interviewees describe enjoying walking or climbing in the area; the experience of the wildness qualities is an integral part of that enjoyment. ➢ Wildness qualities are part of the defining characteristics of the National Park area and, despite being close to population centres, the area is perceived to be very wild. ➢ The remnants of Caledonian Forest can provide a source of spiritual experience within the wild land area.
	Community
	➢ The presence of the West Highland Way and Munros in the area, along with the more general wildness qualities, are key draws to the area for visitors. Communities close to Ben Lui gain economic benefit from visitor spend. ➢ Feelings of ownership and belonging exist among the local community. The wild land area helps to make the wider area a nice place to live in and provides a sense of wellbeing. ➢ There are health and wellbeing benefits for the local community and a high quality of life.
	Wider Society
	➢ The wildness qualities are part of the experiences that attract a diverse range of people to the area. There are a range of outdoor activities within the area for tourists, including hill walking, climbing and fishing. ➢ The mountains and wildness qualities that are inherent to these landscapes are part of the Scottish self-identity and are expressed through folklore/songs. ➢ Experiences in wild areas contribute towards the wider public being part of a 'healthy society'. ➢ The area is of national value and needs to be preserved and enhanced for the wider enjoyment of the general public.
Constraints	**Personal**
	➢ Overall, interviewees have not experienced any personal negative impacts of the wildness qualities.
	Community
	➢ There is some concern about the potential impacts from too many tourists visiting the area and the impacts they can have on the wildness qualities, e.g. it no longer feels as remote and undisturbed;

	there needs to be a balance. ➢ There are potential constraints in relation to the development potential within the area e.g. planned gold mine, renewable projects. Concern over the impacts of these types of development on the wildness of the area may reduce the potential economic benefit from these types of projects to the local area. ➢ There is concern over how to support people and employment on the land where there is some tension over productive land use and maintaining wildness qualities.
	Wider Society
	➢ The interviewees do not feel that there are negative impacts of the wildness qualities for wider society.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Overhead power lines	Pylons at the foot of Ben Lui are viewed by some as having an intrusive visual impact on the landscape, detracting from the wildness qualities.
Footpath management	Footpaths can enhance wild character as they limit erosion. Footpath management has wider benefits through employment provision, facilitating further use and access which in turn increases the popularity of the area. There is also a perceived issue with the creation of unofficial cairns at the mountain tops built by walkers which then need to be removed by land management organisations.
Designations	There is an SSSI on the north face of Ben Lui to protect the montane vegetation and plant communities related to the limestone bedrock, enhancing the wildness qualities of the area.
Grazing – sheep and deer	The numbers of both sheep and deer have been reduced, which is believed to have enhanced habitat quality.
Renewables projects	Large and visible hydro schemes have some negative visual impacts on wildness qualities. Some feel that these constructions blend in with the landscape and are valued for the benefits they provide in terms of energy production. Smaller run of river schemes are not viewed as having negative impacts.
Community woodlands	An increase of native species and hence perceived naturalness of the area has enhanced wildness qualities.

Do wild land qualities benefit or impinge on management activities?

The attractiveness of this area, as a result of its special wildness qualities, presents management challenges in terms of the environmental impacts of high visitor numbers. One approach identified by an interviewee is to encourage tourists to stay within certain areas and to use footpaths to prevent wider damage, although this may make the area feel less remote and so detract from the overall wildness experience.

Due to the remoteness of the area there is little infrastructure and few facilities. The landscape was described as being high altitude, cold, infertile and wet, which can limit the productivity of the land and potential land uses.

Case study: Ben Lui

Facts and figures about the wild land area

- Within the Ben Lui area there is an SPA (Glen Fyne for golden eagles), an SAC and an SSSI on the north face of Ben Lui to protect the limestone bedrock and vegetation habitat.
- The West Highland Way passes through the area. An estimated 50,000 people per year walk the length of this route (West Highland Way website).

General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

Overall, the interviewees do not believe that the benefits and negative aspects of wildness qualities of the area are unique. However, one interviewee suggested that the topology of Ben Lui could be regarded as a unique feature due to the distinctive alpine ambience that can be experienced there. The caldera-shaped corrie is also a striking feature of the area which has been highlighted within guidebooks of the area.

How are ecosystem services provided by the wild land area? (see Map panel 1)

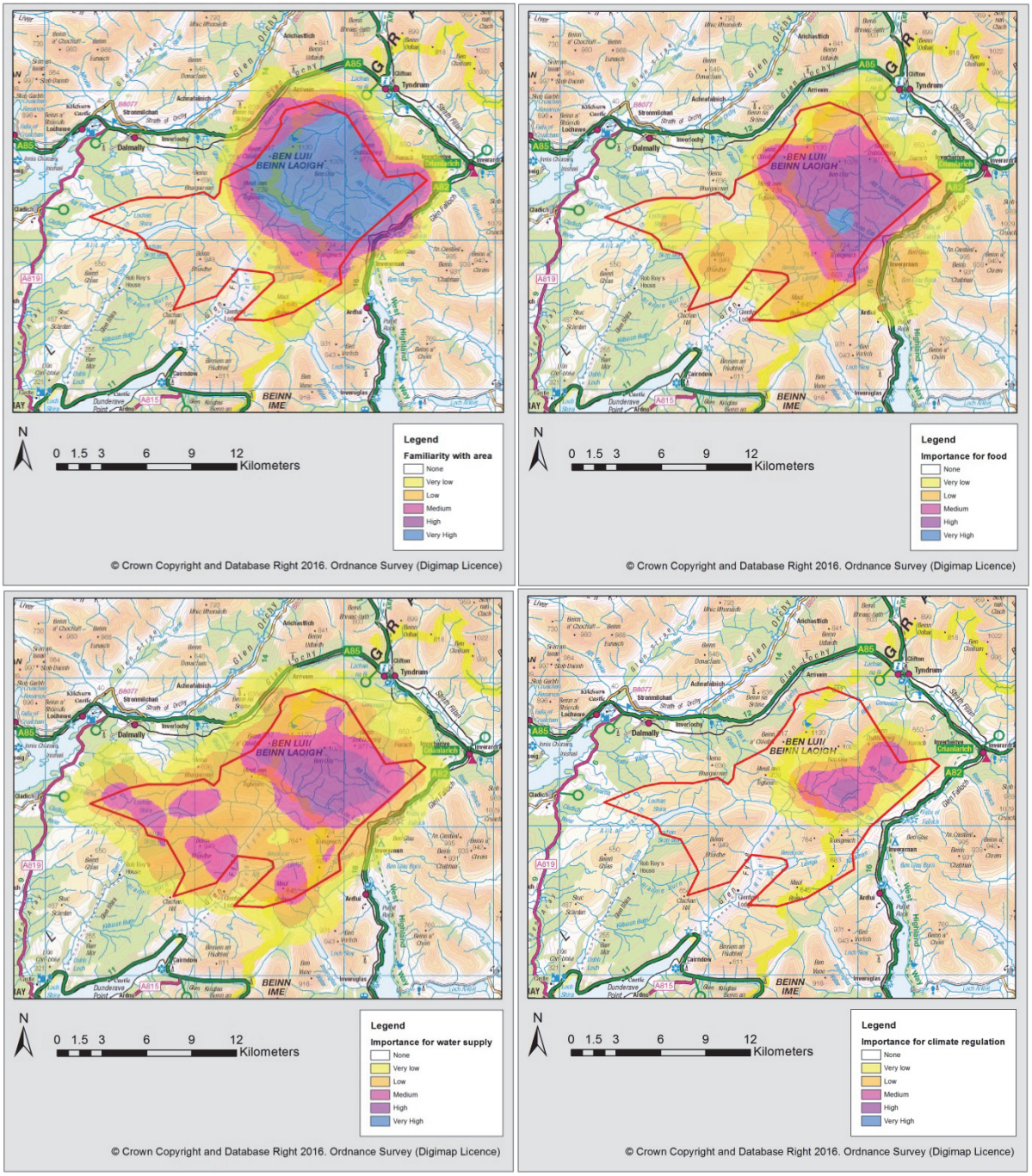
It should be noted that all interviewees for this survey are most familiar with the northern and eastern parts of the wild land area. Some mentioned the natural heritage designated areas as being areas they are particularly familiar with.

Overall, ecosystem services within the wild land area are localised around particular areas and features. Medium to very high levels of importance are associated with 'food production' in the eastern end of the area. There is some hill sheep farming and deer stalking. 'Water supply' is largely located around water sources within the wild land area, with a relatively greater density around where hydro schemes are located or where the water is being supplied to hydro scheme further away (e.g. Sloy hydro scheme). The quality of this water is linked to the wildness of the land in terms of the low intensity of development and agriculture, which allows a good quality water supply to be maintained. 'Climate regulation' services are primarily focussed around the blanket bog areas of carbon-rich peaty soils. This habitat is also thought to contribute to the natural flood management capacity of the area. The mountain of Ben Lui is highlighted as being important for 'tourism and recreation' due to its appeal for hill walkers and climbers. The remoteness of Ben Lui mountain is considered an extra draw and challenge for hill walkers. Some interviewees feel that the whole area had aesthetic appeal due to its wild character. However, two areas viewable from local roads are indicated as particularly important, suggesting that accessibility is important.

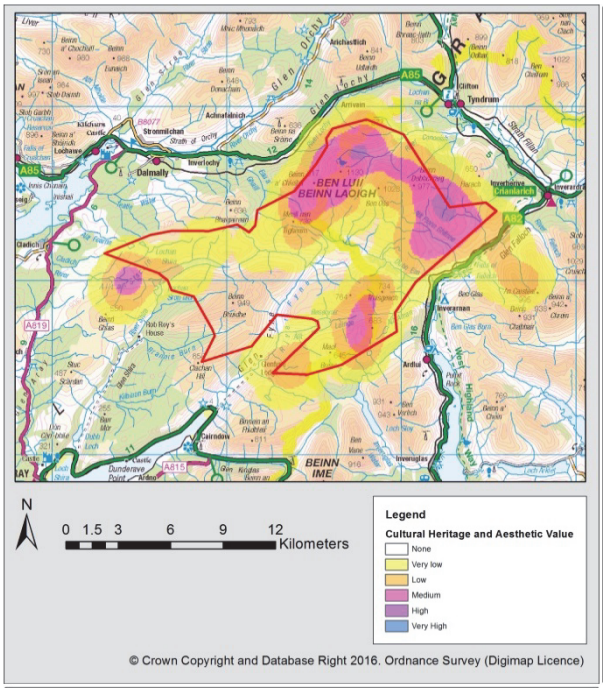
'Wildlife and habitats' are considered to be important across a much larger area than the other ecosystem services. Included within this are areas around the Ben Lui SAC and SSSI, and the SPAs at Glen Etive and Glen Fyne. While these designations are important for biodiversity within the area, it is the physical characteristics of the land and the low levels of disturbance, aspects associated with wildness, that support the existence of wildlife and habitats across the wider area.

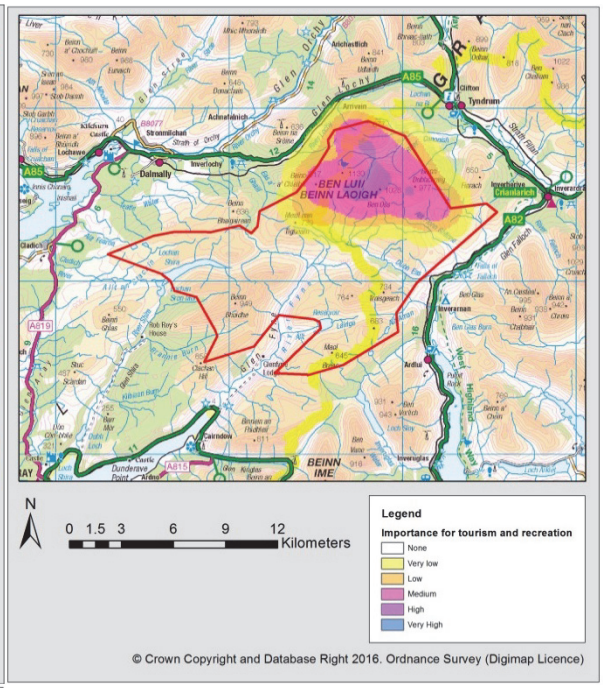
Case study: Ben Lui

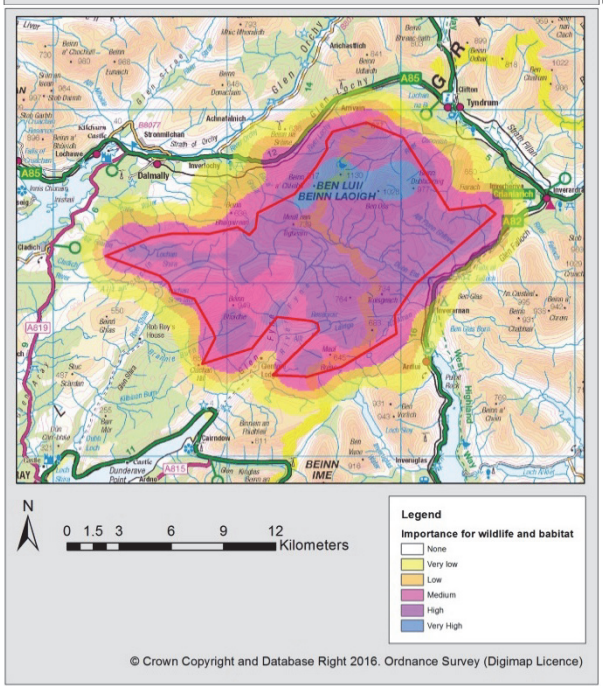
Map panel 1: Ben Lui. Familiarity with area and the importance of area for food production; water supply; climate regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 4 responses)



Case study: Ben Lui







Case study: Cairngorms

General information about wild land area	
Case study name	**Cairngorms**
Description of participants	*RSPB (Abernethy)* *Cairngorms National Park Authority* *Wilderness Scotland (adventure holiday business located in Aviemore, Cairngorm National Park)* *Rothiemurchus Estate (private estate near Aviemore, Cairngorms National Park)* *Scottish Natural Heritage (Cairngorms office)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ The area is important for outdoor activities including walking, swimming, cycling and wild camping. ➢ There is a high quality of life which comes from working and/or living in the area and being able to directly experience the wildness qualities. ➢ The habitat is described as 'primeval'. The evidence of human impact on the Cairngorms plateau is minimal and this contributes to a sense of wellbeing. ➢ There are a number of community engagement initiatives and collaborations e.g. 'Cairngorms Nature', in the area, which are related to the wildness qualities of the area, e.g. conservation, education.
	Community
	➢ Economically, the local area and tourism businesses benefit from visitors who wish to experience the wildness qualities within the area. ➢ There is relatively easy access to areas with wild character. ➢ There are benefits from the ecosystem services within the area, e.g. water quality, although people may not always be aware of them (described as 'indirect' community benefits). ➢ The wildness qualities are seen as a natural asset and interviewees believe that many businesses within the area would not be able to provide their services without them. ➢ The spiritual qualities associated with wildness are highlighted as benefits for local communities and wider society.
	Wider Society
	➢ There are wellbeing benefits for all who go to these areas to experience 'wildness' and get away from everyday activities. ➢ There are ecosystem services and associated economic benefit from the wildness qualities of the area, e.g. from forestry which has potential for expansion. The restoration of blanket bogs contributes to carbon sequestration and climate regulation. ➢ There is conservation management for iconic species of national importance, e.g. capercaillie and golden eagle.
Constraints	**Personal**
	➢ Interviewees have not experienced personal constraints
	Community
	➢ There is a lack of certain facilities in the area because of its

	remoteness and there is little development, e.g. technology, housing, new commercial buildings. ➢ Many of the interviewees suggest that there are no direct negative impacts for the local community due to the wildness qualities but there is the potential for indifference and complacency because the area is perceived to have 'always been that way'. Local people are not always engaged with, and aware of, the particular qualities of wild land. ➢ 'Wildness' is an emotive term and some view the wildness label as contradicting efforts to manage the area positively, e.g. through grazing and muirburn. There is some concern about restrictions on what is viewed as important management. ➢ The history of the area and legacy of past land use mean that some do not necessarily view it as 'wild' and think that there should be better recognition and understanding of how landscapes have been shaped.
	Wider Society ➢ People drawn to the area by the wildness qualities can have a negative impact, e.g. the increasing use of electric mountain bikes and mountain bikes has changed the experience for other users of the landscape. Tensions between user activities may detract from enjoyment of the wild area. ➢ The way some areas are managed for tourism is based on zoned access provision. Infrastructure exists in some places to allow people to engage better with the area, e.g. visitor centres, but this may detract from the sense of wildness. Away from visitor-focused areas, access is more challenging but the sense of wildness greater. ➢ Overall, interviewees do not think that there are negative impacts for wider society, as the wildness qualities of the area have remained relatively consistent over time.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Landscape-scale management	This approach allows habitats to flourish, improves water quality, protects against erosion and improves natural flood management. Overall landscape-scale management enhances the natural processes within the landscape which in turn enhances the wildness qualities.
Access – path work and maintenance	This can be viewed as an obvious human impact on the landscape detracting from the wildness qualities. However, many interviewees feel that paths protect the area by preventing more widespread soil erosion.
Tourism	Damage and disturbance can be a problem, e.g. dogs disturbing birds (including capercaillie) and littering. However, this is described as a 'manageable threat' to the wildness of the area.
Ski area	The influences on the wildness qualities are broadly stated as being the same as for tourism above. However, the ski area is specifically mentioned due to its popularity as providing a source of access to the mountains. While it detracts somewhat from the wildness qualities, it is acknowledged to bring considerable economic benefit to the area. One interviewee commented that, considering the

	number of people that use the ski area, there is limited damage and habitats have recovered quickly following the original construction.
Renewables, including wind farms	Renewable schemes can have significant aesthetic and environmental impacts. Improved siting of renewables schemes could help minimise such impacts.
Game management – deer and grouse	Management to control the number of deer within the area is viewed as enhancing the wildness qualities. Game management associated with deer and grouse helps to maintain habitats of national importance, e.g. heather moorland. However, there is another view that such management can detract from the wildness qualities because of the visual impact of hill tracks and muirburn.
Farming (largely sheep and cattle)	Farming can provide positive economic benefit but can have negative impacts if areas become overgrazed.
Forestry/woodland	Fencing of some woodland and forest is seen as being visually detrimental but the growing focus on planting native species is beneficial. In some areas fencing is avoided and other methods of seedling protection employed, which is viewed as a positive step.

Do wild land qualities benefit or impinge on management activities?

Those who are managing the land are aware of the people coming to use the areas, and the 'public interest' in the land and its wildness qualities are an important aspect of that. Perceptions of wildness qualities can have a temporal dimension. Human artefacts, for example, can be both celebrated if perceived to be old and part of the cultural heritage of the area or, if more recent, they can be less-well received.

The land and its remoteness/exposure/high-altitude/nutrient-poor status all influence the vegetation and what can grow there. The largely peaty soil is watery and shallow therefore productivity is low, so limiting management potential. Management may also be challenging due to the accessibility of the area, for example culling deer and carcass extraction can be difficult. Hill tracks can detract from wildness but do facilitate management.

Facts and figures about the wild land area

- The National Park has about 1.5 million visitors per annum. A recent survey (2014/2015) found that 16% get around the national park area by walking and about 7% cycling and the majority are likely to access the wild land area.
- From the same survey it was found that 35% of tourists feel that the main reason for visiting the area is the 'landscape and scenery'. 65% of visitors feel that 'views, beauty and scenery' is what they most enjoyed about the area.
- A survey in 1997/98 found that around 125,000 hill walkers per year visit the Cairngorm massif, which is one of the most popular parts of the wild land area. This survey excluded skiers and short-distance walkers.

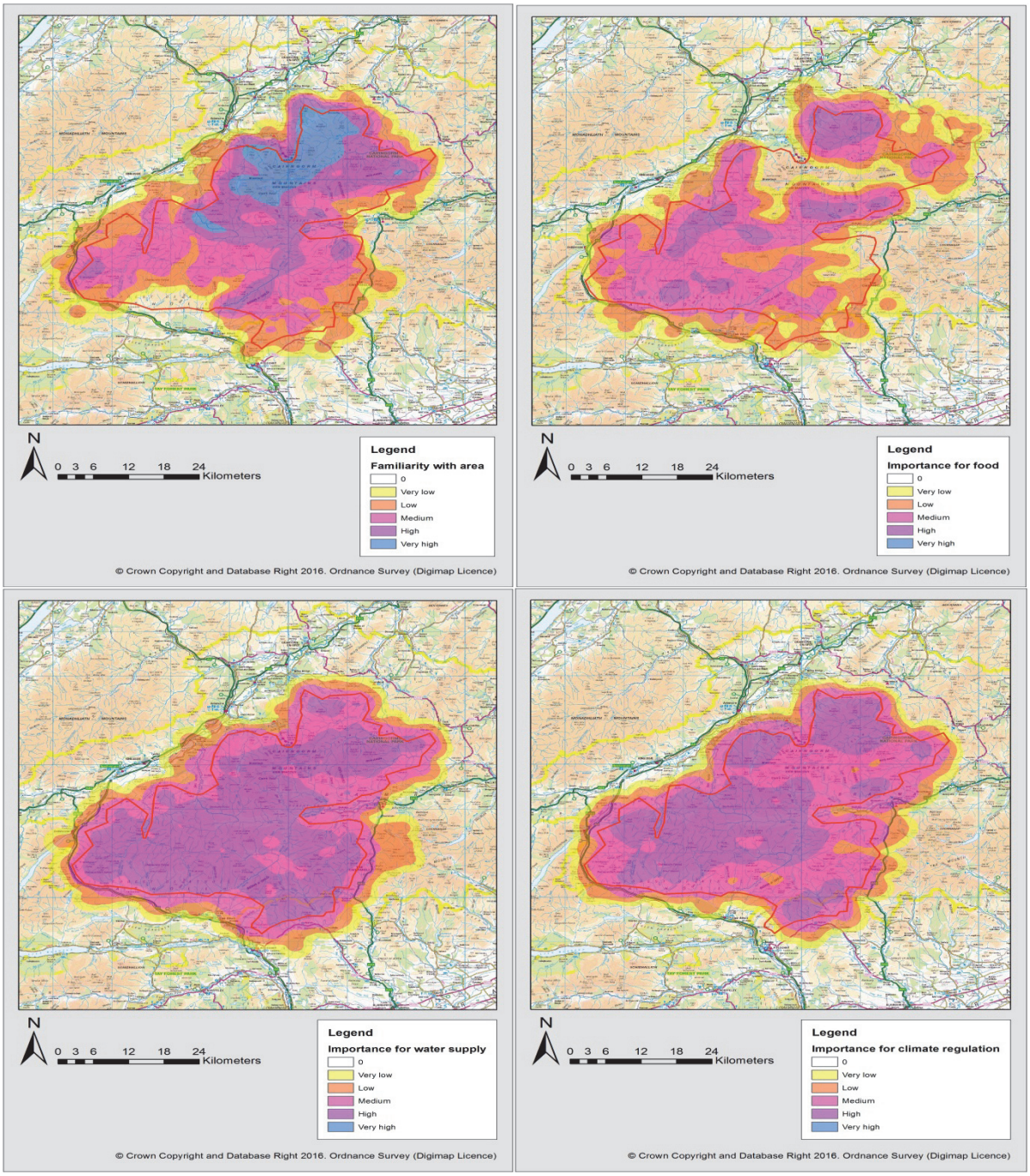
General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

The diversity of habitats within the wild land area (and those surrounding it within the National Park area) contributes to the wildness qualities, making it an evocative and unique landscape. However, there is an emphasis that positive and sensitive management should not be prevented.

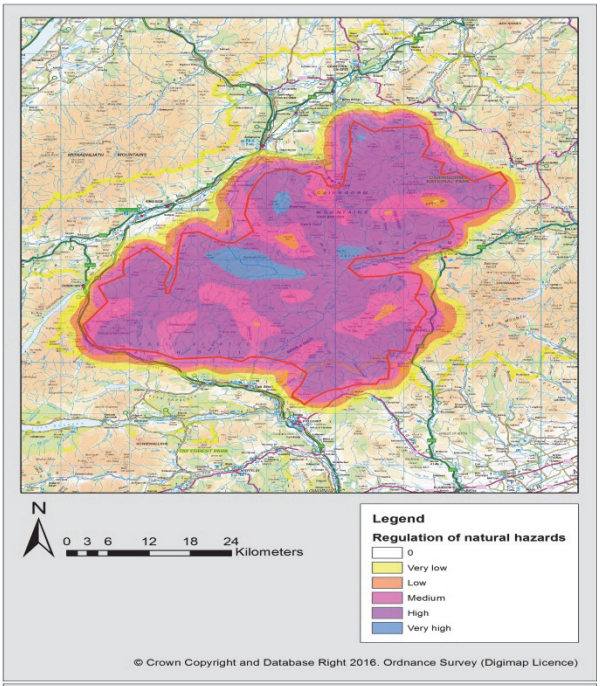
There are a range of outdoor activities available for visitors to the Cairngorms. Some interviewees highlight the role of social media and the influence this has on the number of

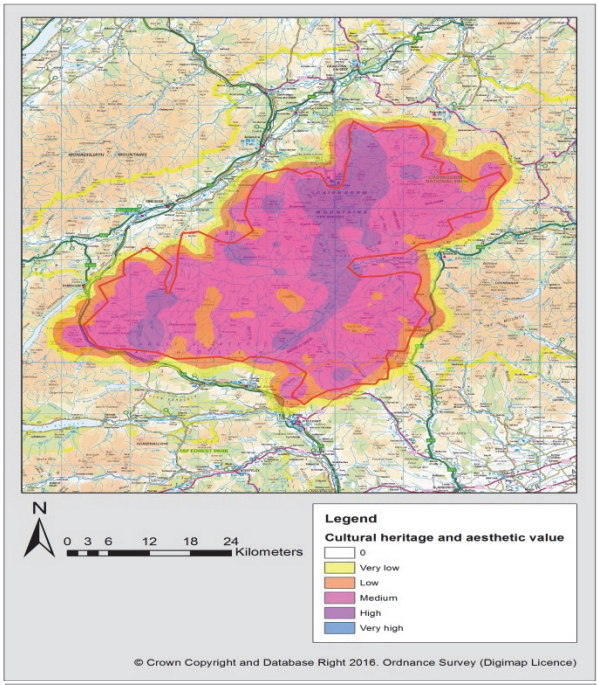
people who want to visit the Cairngorms as it becomes more well-known. The high quality of facilities in the area attracts a range of visitors, e.g. the extensive path networks, signage, directions, interpretation and litter bins, but these can detract from the wildness qualities.
How are ecosystem services provided by the wild land area? (See Map panel 2)
Large parts of the Cairngorms deliver a wide range of ecosystem services. There is a particular importance attached to 'wildlife and habitats' with a considerable core area of very high value. In general, it is thought that land management in the area is sympathetic to wildlife conservation and there is high aspiration for maintaining and expanding forested areas. The large coverage of protected areas contributes to allowing wildlife and habitats to thrive. 'Food production' is mostly considered in terms of game and the limited productivity of the land for agriculture is highlighted. 'Water supply' is indicated as important across the whole area which forms the upper catchments of major rivers important for water supply. Water quality benefits from minimal pollution and very little human-induced sedimentation. However, it is also suggested that habitat restoration through reduced grazing and burning would help maintain a high quality supply. Extensive peatlands across the whole area, apart from high tops, are highlighted as important for 'climate regulation' in addition to woodland and forestry. Peatland and woodland are also considered important for natural flood management. Reduced grazing to encourage well-vegetated slopes would help slow run-off rates, increase water storage and stabilise slopes reducing erosion. Generally, high naturalness is thought to regulate natural hazards. The Cairngorms is of high importance for tourism and recreation. Areas with high Munros and established through routes, bothies and focal climbing areas are given particular emphasis on the map. Remoter reaches of the area are now attracting higher numbers of mountain bikers. The area is a core part of the history of mountain recreation which attracts many people to visit particular locations and bothies. The landscape is significantly influenced by centuries of management and therefore has great 'cultural heritage'.

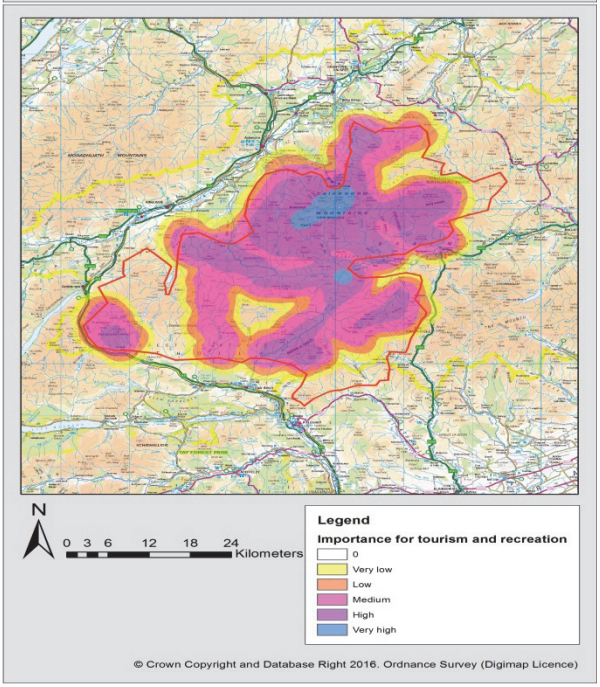
Map panel 2: Cairngorms. Familiarity with area and the importance of area for food production; water supply; climate regulation; natural hazard regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents

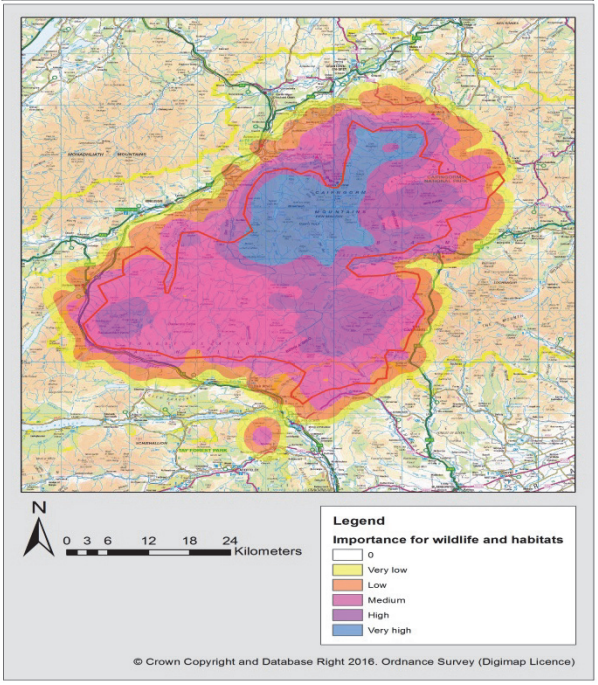


Case study: Cairngorms









Case study: Causeymire-Knockfin Flows

General information about wild land area	
Case study name	**Causeymire-Knockfin Flows**
Description of participants	*Flows to the Future (project part of the Peatlands Partnership to restore areas of blanket bog in the Flow Country)* *Environment Research Institute (academic research body based in Caithness)* *Private estate owner* *Timespan (heritage and arts organisation based in Helmsdale)* *Scottish Natural Heritage (Caithness and Sutherland office)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ There is an intrinsic value to the wildness qualities of the area and a personal sense of wellbeing when in the landscape. ➢ The area is an extensive, flat plain of peat and has not been significantly impacted by large-scale forestry. This contributes to the wild and remote qualities creating a sense of wellbeing.
	Community
	➢ Tourism is important to the local economy as there are not many alternative employment sectors. The wildness qualities of the area are described as an integral part of the attraction of the area for tourists. ➢ Ecotourism is becoming more prevalent within the area, particularly in relation to the resident and over-wintering migratory bird species attracting bird-watchers to the area. ➢ According to one interviewee, there are changing local community perspectives of the value of the landscape. Generally, local people have considered 'value' in terms of productive activities such as forestry, agriculture and peat extraction but there is a growing appreciation of the 'non-productive' values of the land and how it could be used for alternative purposes. ➢ The area is a good place for walking, providing health and fitness benefits for local people.
	Wider Society
	➢ The area has the largest expanse of blanket bog in the UK. There is increasing international importance attributed to this resource, in terms of ecosystem services such as carbon sequestration and climate regulation. Regionally, the blanket bog area can retain water helping to regulate catchment flow and reducing flooding downstream in settlements such as Thurso. ➢ The landscapes of the area contribute to Scotland's overall natural beauty.
Constraints	**Personal**
	➢ The remoteness of the area, combined with a prioritisation of environmental protection, has resulted in a lack of employment in the area, which is likely to remain a constraint to the community in the future.
	Community
	➢ The community is not homogeneous and there are a range of positive and negative perceptions associated with the wildness of the area. For

	example, some may wish to promote the wildness qualities in order to increase biodiversity. In contrast, others may see the wildness qualities as restrictive to development opportunities that would bring economic benefits to the area. ➢ For those who work within the wild land area, there are challenges due to the relative lack of infrastructure. For example, the relatively small number of tracks in the area makes it more difficult for gamekeepers to remove deer carcasses from the hill.
	Wider Society
	➢ There is a fine balance needed between attracting tourists to the area and maintaining the wildness qualities that tourists seek.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Sporting estates (Grouse and deer management)	High deer numbers result in overgrazing within the area, which some interviewees feel detracts from the wildness qualities and impacts negatively on biodiversity. In the wooded straths (SSSI) in the southern part of the WLA, deer grazing presents a challenge for the condition of biodiversity. Sporting estate management has influenced the landscape, making the area less 'wild' than some perceive it to be.
Muirburn	Muirburn occurs primarily in the south of the area. A mixture of straight lines and patchwork pattern has a negative visual impact on the wildness qualities. Concerns exist about large-scale muirburn which, if not undertaken correctly, can cause damage to peatlands and reduce capacity for climate regulation.
Renewable energy developments	A number of wind farm applications have been lodged outside the wild land area, but within sightlines from the area. This is a potential detraction from the wildness qualities. However, planning regulations require restoration of peatland surrounding a development, to a size that is the same or larger than the development which is viewed as positive.
Forestry	There is now funding in place to replace commercial forestry (largely conifer) with peatland. Commercial forestry can detract from wildness qualities but also has the potential to enhance wild land qualities if well-managed. Forestry could contribute more to wildness through better integration with other land uses, for example a mix of open peatland, broadleaf forestry and small scale commercial forestry. Such diversification may also have community benefits in terms of greater employment opportunities.
Water quality	The preservation and enhancement of water quality within the area helps to enhance the perceived wildness of the area.
Bird species	Habitat management for rare bird species, including red and black throated divers, helps to improve biodiversity and the perceived naturalness of the area.
Salmon and trout fishing	Although this is a low level management activity, fishing boats (and associated boat houses) on some of the more remote lochs can detract slightly from wildness qualities.

Case study: Causeymire-Knockfin Flows

Access	The area was described as being largely inaccessible due to the boggy nature of the environment enhancing the wildness qualities. These access challenges can be daunting for some tourists. Walking and cycling paths can enhance engagement between people and the landscape but they can have a negative visual impact. An increase in the number of people using these paths may reduce the perceived 'remoteness' of the area.

Do wild land qualities benefit or impinge on management activities?

Some interviewees do not consider the area to be 'wild land' because the landscape is managed and has had human settlement within it both historically and currently. Despite this, they value the wildness qualities. Accessibility issues (in particular the lack of roads) restrict the number of people who can access the area. Consequently, this may influence how tourism is managed within the area. One interviewee explained how the direct benefits of the wildness qualities are primarily experienced by those physically able to access and walk within the landscape, despite the small number of tracks which are located primarily in the northern part of the area.

The land determines and constrains the type of management that can take place within the area. Where there is deep peat, opportunities are limited as the soil is not productive. However, there are also pockets of more mineral-rich soils which would be suitable for growing trees.

Facts and figures about the wild land area

- Two people live on the periphery of the wild land area, although this increases in August/September (to around 30-40 people) during the peak of the tourist and stalking season.
- Larger settlements are generally located along the east coast outside the wild land area boundary.
- There was a 'gold rush' in the 1800s when gold was found along the western edge of the hills in the south (near Kinbrace). Tourists and locals can still pan for gold from the hills within the wild land area. Development proposals for mineral extraction have presented a potential issue for land management activities, although the last proposal of this kind was around 15 years ago.

General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

Visitors who come for the sporting activities provide income to the area through the use of local accommodation, shops, pubs and restaurants. The area does not attract as many non-sporting tourists, e.g. walkers, mainly because of the lack of Munros and the perception of remoteness.

The area is unique in the preservation of human artefacts on the land. Whereas the remnants of past highland settlements in other areas of Scotland have disappeared, within the Caithness area many of these remnants remain. For one interviewee, this is one of the most important factors within the area and where much of the real 'value' of the landscape resides. Although the presence of past habitation within the landscape may contradict notions of 'wildness', this is considered an integral part of the landscape.

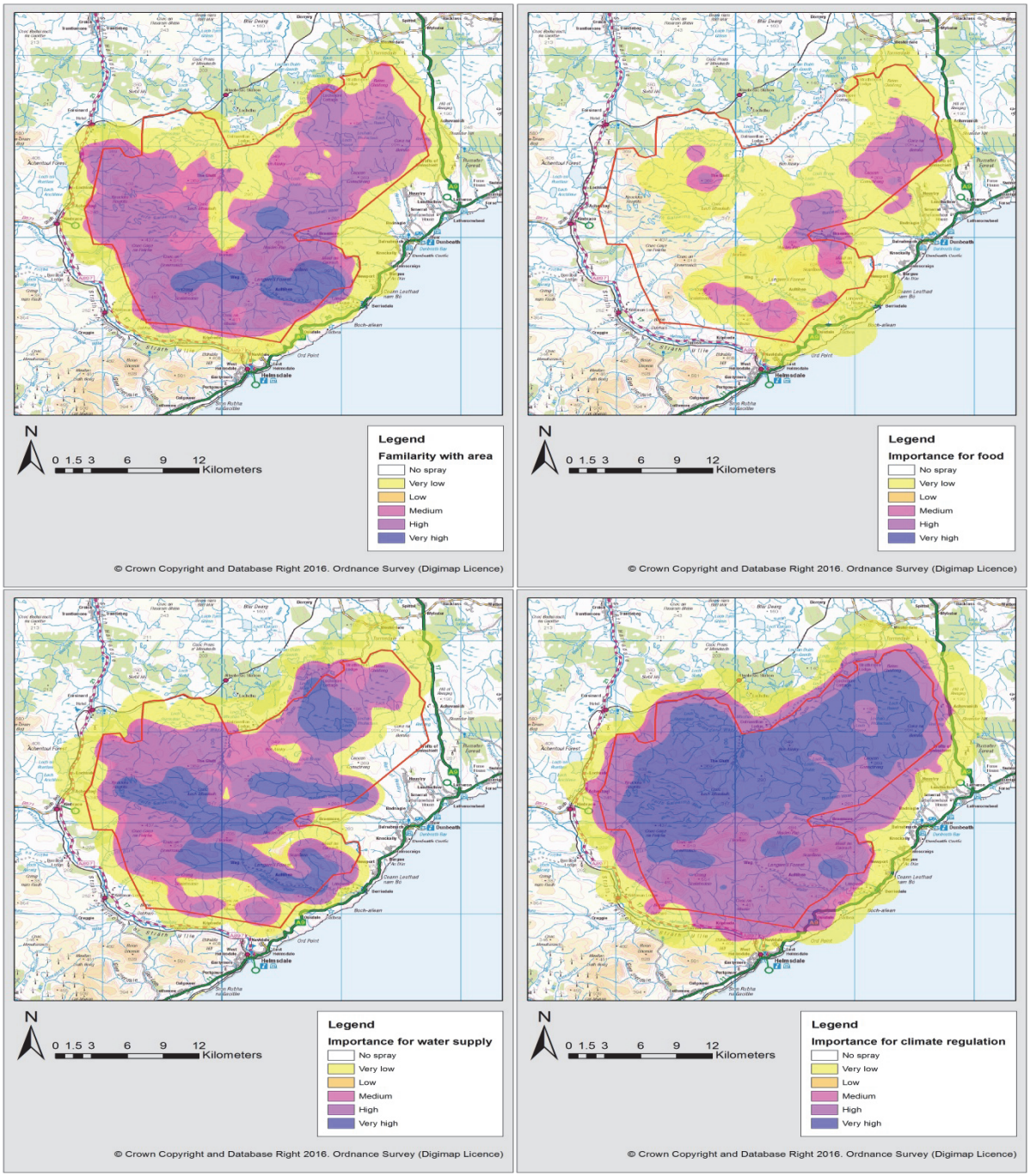
The feeling of isolation and perceived remoteness within the wild land area is considered unique, not only within Scotland and the UK, but also in Europe. One interviewee commented that it is difficult to find areas like this and it is one of the last corners of 'wild' areas within an industrialised Britain.

Case study: Causeymire-Knockfin Flows

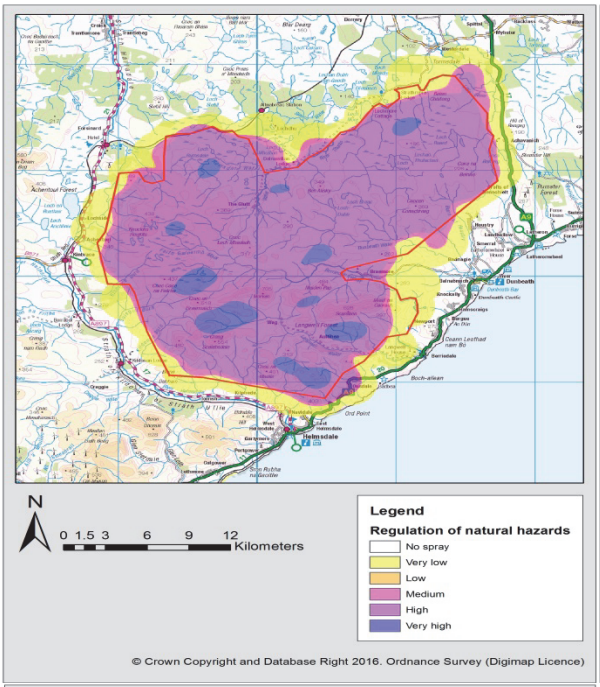
How are ecosystem services provided by the wild land area? (see Map panel 3)
Wild land qualities are thought to benefit sensitive plants such as sphagnum moss due to a lack of trampling. The area is also important for moorland birds, including rare species such as golden eagle, which are also sensitive to disturbance. The whole area is considered moderately important for 'wildlife and habitats'. 'Food production' is of relatively low importance although there are some areas of rough grazing for livestock which provide meat to local markets. However, the rugged nature of the area means that livestock need to be 'off-wintered' in the lowlands to maintain required body size for food production and breeding. Vegetation is nutrient-poor and doesn't support large numbers of animals. There are some important catchment areas for 'water supply' highlighted on the map, e.g. River Thurso which benefits local communities. The wildness qualities contribute to the cleanliness of the water supply which is good for species such as Atlantic salmon. 'Climate regulation' is considered the most important ecosystem service in the area. The value of bog habitats for carbon storage was highlighted; the ruggedness of the landscape is likely to have reduced exploitation of the peat resource for fuel. Blanket bog was also valued for its role in regulating water flow and reducing erosion. However, some drainage of moorlands has reduced capacity for natural flood management and increased erosion in some areas. There are substantial areas considered important for 'tourism and recreation'. People are attracted by the remoteness and the views across the largest part of the Flow Country unaffected by large-scale afforestation. The hills in the area have high aesthetic value as they dominate the landscape and form part of a distinctive landscape. 'Cultural heritage' is an important aspect of the southerly part of the area. There are reportedly extensive archaeological remains in the Flow Country that are not well-visited; this is partly due to the inaccessible nature of the wild land area. Few visitors reach the heart of the area due to its boggy and remote character.

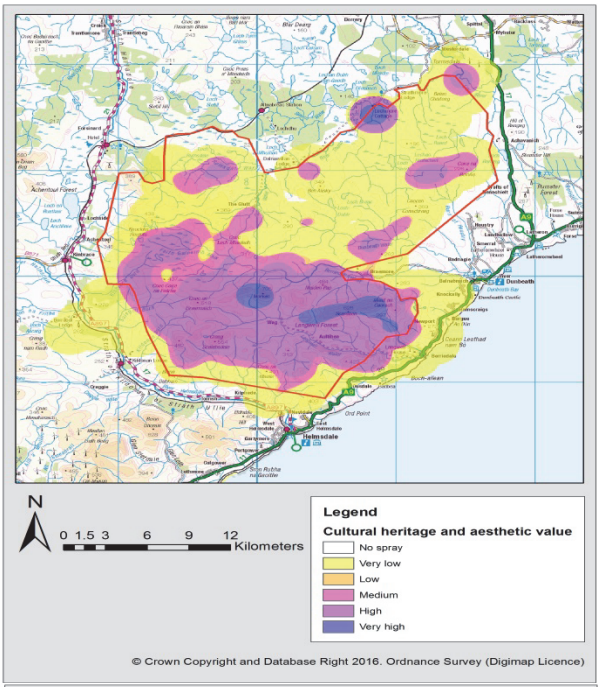
Case study: Causeymire-Knockfin Flows

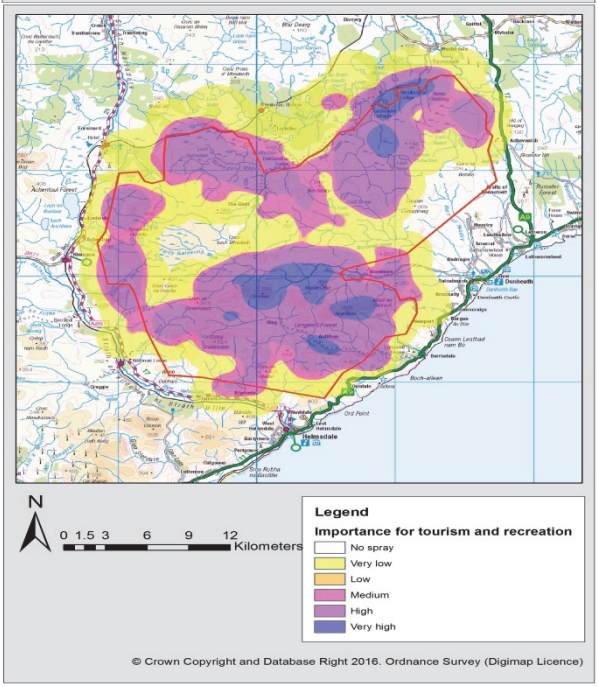
Map panel 3. Causeymire-Knockfin Flows. Familiarity with area and the importance of area for food production; water supply; climate regulation; natural hazard regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 3 responses).

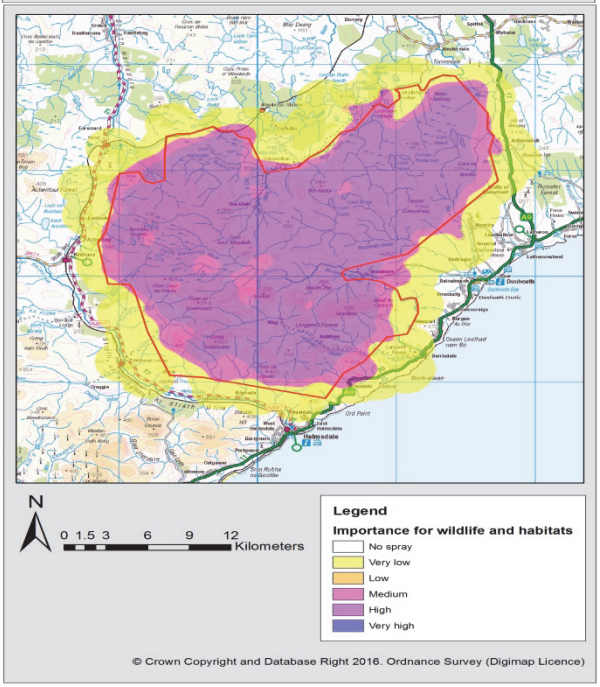


Case study: Causeymire-Knockfin Flows









Case study: Central Highlands

General information about wild land area	
Case study name	**Central Highlands**
Description of participants	*Culligran estate (a working sheep and deer farm, private estate)* *North Affric estate (private estate)* *Highland Council* *Trees for Life (conservation volunteering charity)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ Some interviewees view 'healthy deer stocks' as important for enhancing the wild character of the area ➢ The experiences and challenges for walkers from the combined attributes of wildlife, remoteness and ruggedness contribute to personal wellbeing.
	Community
	➢ Estate and conservation management in some parts of the wild land area provide indirect benefits to the community through the use of local labour and resources, e.g. use of local contractors for fencing and building work. ➢ The deer stalking industry brings income and employment to the area. ➢ People enjoy the sense of escape that wild land provides; this leads to visitors contributing to the local economy, which is rather reliant on tourism. ➢ Wildness qualities attract incomers to live in communities adjacent to wild land, which helps provide 'new blood', ideas and stimulates community activity.
	Wider Society
	➢ Network of paths and a car park installed by the Forestry Commission allow the general public to access the area. The photogenic landscapes, which include particularly scenic lochs, mountains and woodlands, help to publicise Scotland as an attractive place to visit. The wider public benefits through their visits to the area. ➢ The area is very important for biodiversity and contains numerous designations (SSSI, NSA, SAC, SPA). ➢ The structure of the landscape means that there are no through roads in the area. This is highly beneficial for the conservation of nature and biodiversity in the area. People tend to live on the periphery of the area rather than within it, which contributes to its wildness qualities. ➢ The area attracts volunteers who wish to get involved with conservation work. ➢ There are remains of human activity in the area, such as old mines, mills and roundhouses which represent valuable cultural heritage. ➢ Areas such as this have a high existence value; people like to know that they exist and enjoy reading about them and seeing pictures of them even if they don't go there themselves.

Case study: Central Highlands

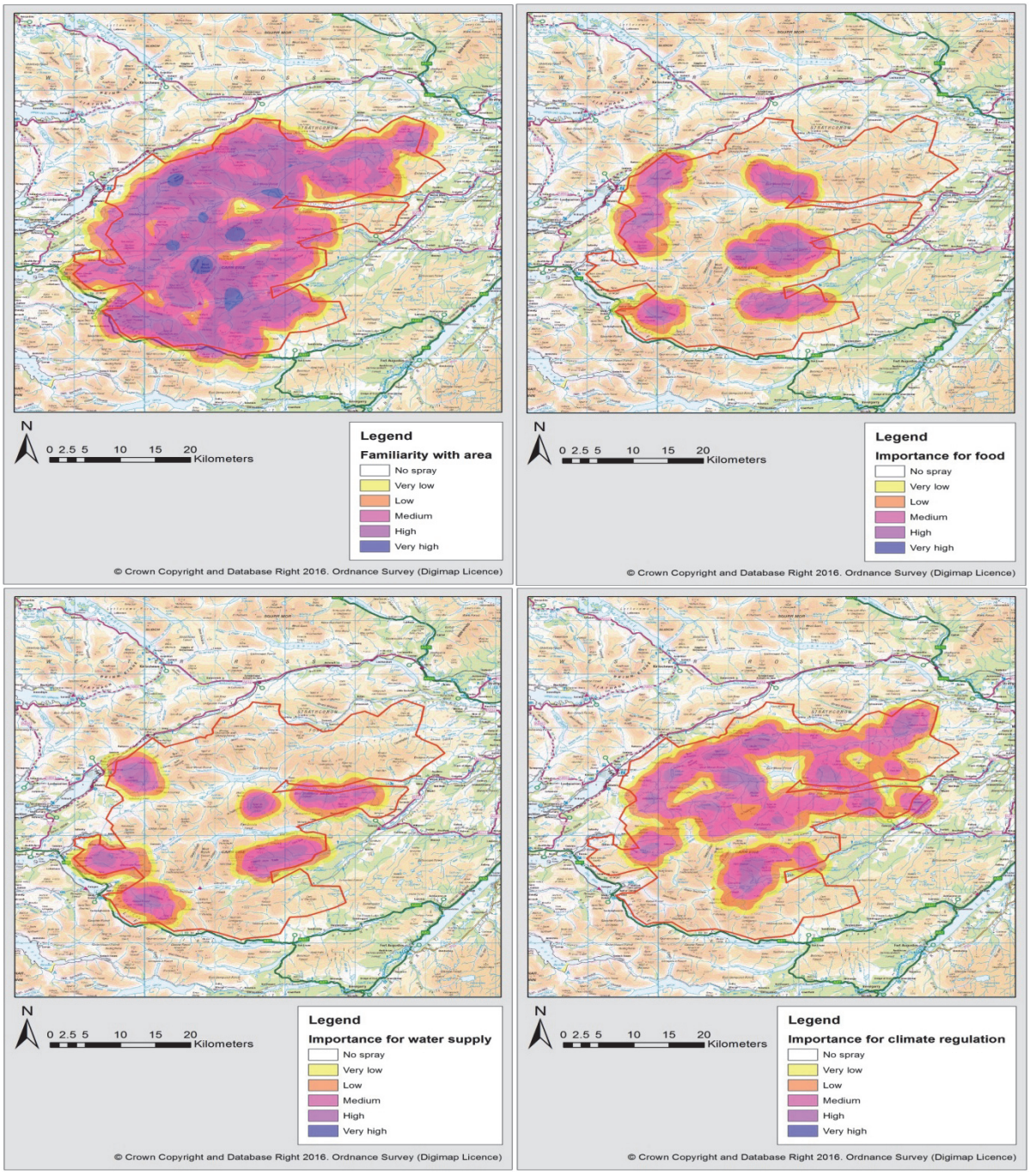
Constraints	**Personal**
	➢ There is some conflict between deer stalking and access by walkers which can pose challenges for land managers in the area.
	Community
	➢ Increased visitor numbers due to the popularity of the area has increased traffic on the roads, which sometimes puts pressure on local services, e.g. emergency services. ➢ An increasing awareness among the general population of wild land and increased visitor numbers, while bringing many benefits to individuals and the local community, could actually detract from the wildness of the landscape. Acute problems such as increased conflict with existing land users and footpath erosion may develop. ➢ Efforts to restore footpaths to minimise erosion are on the whole beneficial, but footpaths installed in more remote areas will take away the ruggedness attribute that is highly valued. A balance needs to be struck. ➢ The relationship between the local community and wild land was reflected upon by one interviewee who explained that some of the community could feel alienated by the growing view of the area as a special area of wild land. ➢ The increased involvement of organisations from outwith the area is viewed by some as 'local people being told what to do'. To avoid the feeling of being restricted in their activities, communities should to be involved in the initiatives related to wild land.
	Wider Society
	➢ There are some concerns about further statutory designations.

Management activities in the area	
Activity	*Does activity enhance or detract from wildness qualities?*
Deer management	'Healthy deer stocks' are considered by some to be symbolic of a high quality wild area and a fundamental part of its wild character. There is a view that deer culling operations detract from this. An opposing view more commonly expressed, is that overgrazing by deer prevents regeneration of the native Caledonian woodland which is what makes the area unique and iconic.
Footpath maintenance	Restoring footpaths to minimise erosion is, on the whole, beneficial but building footpaths in more remote areas would detract from the ruggedness qualities so a balance needs to be achieved.
Heather/grass burning	This is done in accordance with SNH guidelines to maintain healthy vegetation and encourage new growth that provides food for deer.
Regeneration of native Caledonian forest	Regeneration of native Caledonian forest (using fencing) enhances wildness.
Fencing	The use of fencing by estates in some remote areas is considered to detract from wildness. Fencing can inhibit the natural movements of deer across the land, which detracts from

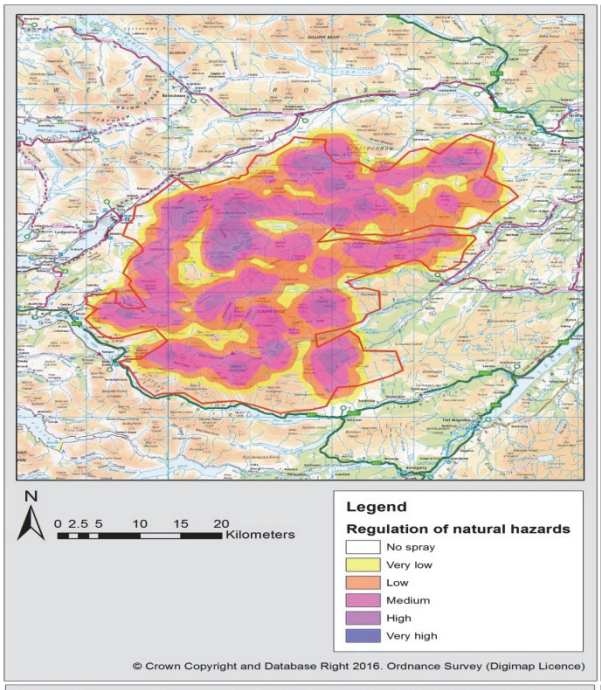
	its wild character.
Livestock grazing	Cattle grazing is thought to have a negligible effect on wildness qualities but overgrazing by sheep is viewed as having a considerable negative impact.
Pheasant and partridge breeding	This has increased in recent times and there is a concern that it will have a negative ecological impact through changing the food chain. The impacts are unclear but there is a view that this could lead to an increase in predator numbers which will damage other species.
Renewable energy developments	There are a few wind farms around the periphery which have had a visual impact on the wildness qualities of the area. Tracks and associated infrastructure for hydro schemes have also been constructed.
Do wild land qualities benefit or impinge on management activities?	
Logistics, access and a lack of infrastructure can be barriers to commercial production in this remote area. For example, it is difficult to extract timber out so there can be some wastage.	
Facts and figures about the wild land area	
➢ None reported	
General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)	
The remnants of the native Caledonian forest are a unique attribute and benefit to the area; Affric is the largest area of such habitat. One interviewee pointed out that there are few places that could match this wild land area in terms of its size, but he also emphasised that there are many special areas in Scotland and the benefits derived from this one are not unique. However, the area is generally recognised as having iconic value to Scotland and is thought to offer a special tourist experience due to its combination of high mountains, great forests and lochs. Landscape photographs of this area are frequently used to promote Scotland.	
How are ecosystem services provided by the wild land area?	
There was insufficient mapping data gathered from this area	

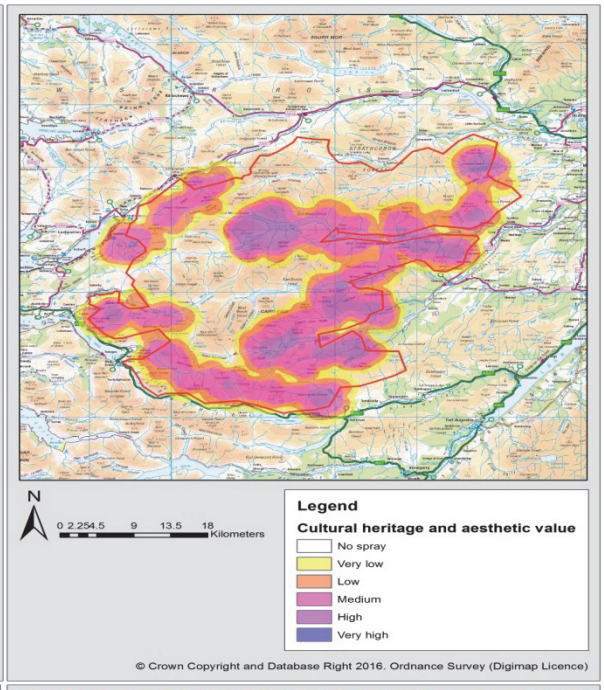
Case study: Central Highlands

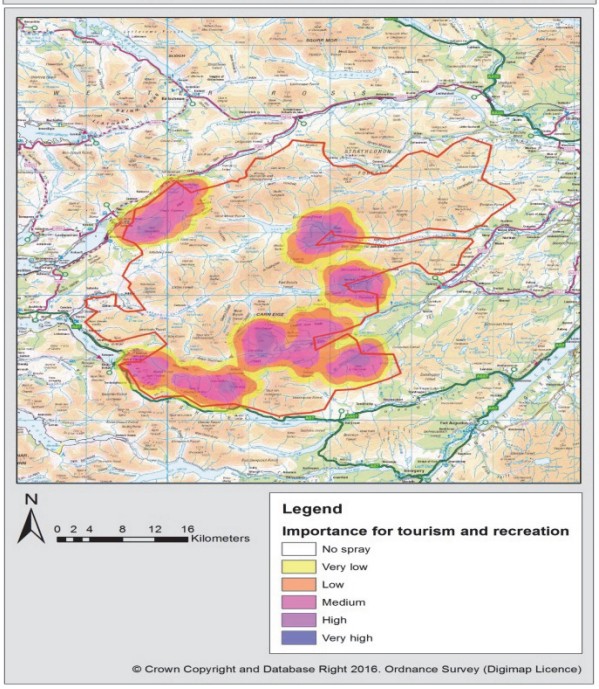
Map panel 4: Central Highlands. Familiarity with area and the importance of area for food production; water supply; climate regulation; natural hazard regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents

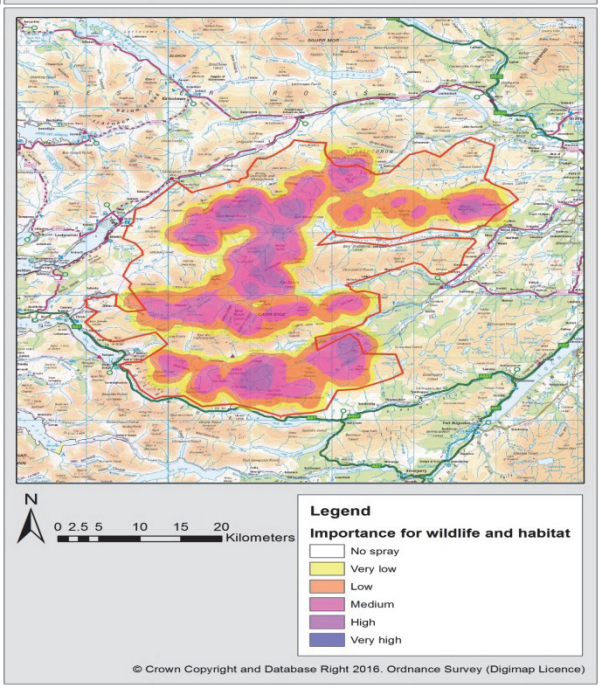


Case study: Central Highlands









Case study: Cuillin

General information about wild land area	
Case study name	**Cuillin**
Description of participants	*Highland Rangers (local authority)* *Scottish Natural Heritage (Skye and Lochalsh area)* *Farmer* *Skye Guides (local climbing and guiding business)* *John Muir Trust (non-government charity organisation)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ There is significant appreciation for being able to experience the wildness qualities of the Cuillin hills, e.g. through walking and climbing. The wildness qualities are an important aspect of why the interviewees go out into the area in their own leisure time. ➢ Being able to see wildlife in the area is an important aspect of being out in the hills, although secondary to the overall experience of being in the landscape. ➢ Being able to see wild landscapes is important for people's personal wellbeing.
	Community
	➢ The wildness qualities of the area, in particular the ruggedness and perceived naturalness, are an attraction for tourists and of economic benefit for tourism-related businesses. ➢ Footpaths in the area increase accessibility and these have been built for different abilities. Increased accessibility may help to attract more tourists to the area and boost the tourism trade, bringing further economic benefits. ➢ Water-based tourism within the area, including kayaking and boat trips from Elgol to Loch Coruisk, provides economic benefit.
	Wider Society
	➢ The iconic and rugged landscapes of the Cuillin mountains are a major tourist attraction. ➢ The range of footpaths and accessibility of these footpaths allow a large number of people to experience the wildness qualities of the hills.
Constraints	**Personal**
	➢ Poor soil quality limits the extent to which land can be used for agricultural production.
	Community
	➢ Some people may have a perception that wildness is a restrictive quality. For example, linking wildness to an absence of human artefacts in an area where people once lived and worked may result in tensions over a lack of local housing development. ➢ Higher tourist numbers have led to increased traffic on small roads, particularly during peak season. ➢ High visitor numbers have led to increased numbers of calls to Skye Mountain Rescue to help people in the Cuillin.

	➢ The use of social media to promote some of the more remote areas, including the Fairy Pools near Glenbrittle, has had some negative impacts. There is now increased traffic on smaller roads, with a lack of suitable car parking facilities leading to reduced access for other drivers (due to parking on road edges). ➢ Apart from the path network, there are few tourist facilities in and near the wild land area, resulting in increased erosion and litter. ➢ Some local people have always regarded the area around the Cuillin as being 'wild' and 'rugged'. Some may not feel that the wild land area description is important, particularly as some statutory designations are in place.
	Wider Society ➢ In general, interviewees do not feel there are direct negative impacts of wild land qualities for wider society. ➢ Public resources directed towards the management of negative impacts of tourism (e.g. removal of litter, footpath maintenance) may impact on how the wildness qualities are experienced in the future. For example, an increase in footpaths, car parks and other infrastructure may reduce the wildness qualities of the area.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Footpath work	Despite footpaths being an obvious human artefact in the landscape, they are recognised as preventing the more pressing, long-term issue of soil erosion. Paths that are built from local materials are considered most appropriate, both in terms of contributing to the local economy and in ensuring that paths have the least possible visual impact.
Deer management	Deer management both enhances and detracts from the wildness qualities. The practice of leaving deer carcasses on the hill to provide food for other wildlife in the area is viewed by some as helping to enhance wildness qualities but the use of quad bikes to remove deer carcasses from the hill can be a disturbance. However, it is believed that deer management is beneficial overall.
Fencing for cattle management	There is minimal stock farming within the wild land area, although fencing of cattle is used to prevent overgrazing. This management activity is not thought to detract from wildness qualities.
Conservation of white-tailed eagle and golden eagle	The Cuillin has an SPA designation (amongst other nature conservation designations including, SSSI and NSA). Conservation of both eagle species is seen as enhancing the wildness qualities.
Tourism numbers	Tourism numbers have increased over the past 30-40 years. Increased visitor numbers in particularly popular areas are found to detract from wildness qualities and experiences.

Do wild land qualities benefit or impinge on management activities?

Many interviewees perceive the wildness qualities of the area as long-standing and integral to the landscape. Management practices are shaped by the land/terrain and limited by what is possible in such a rugged landscape

Case study: Cuillin

Facts and figures about the wild land area

- A mountain guiding company in the area estimated to receive around 1,000 to 1,500 paying customers per annum.
- In 2014 people counter data from the Fairy Pools recorded 141,142 passes (Highland Council website). Actual visitor numbers are approximately half of this figure.

General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

The combination of the Black and Red Cuillin mountains was expressed as a unique aspect of the wild land area. Interviewees explained how the iconic status of these mountains is used to market both Skye and Scotland more broadly to tourists. The area has been used as a filming location.

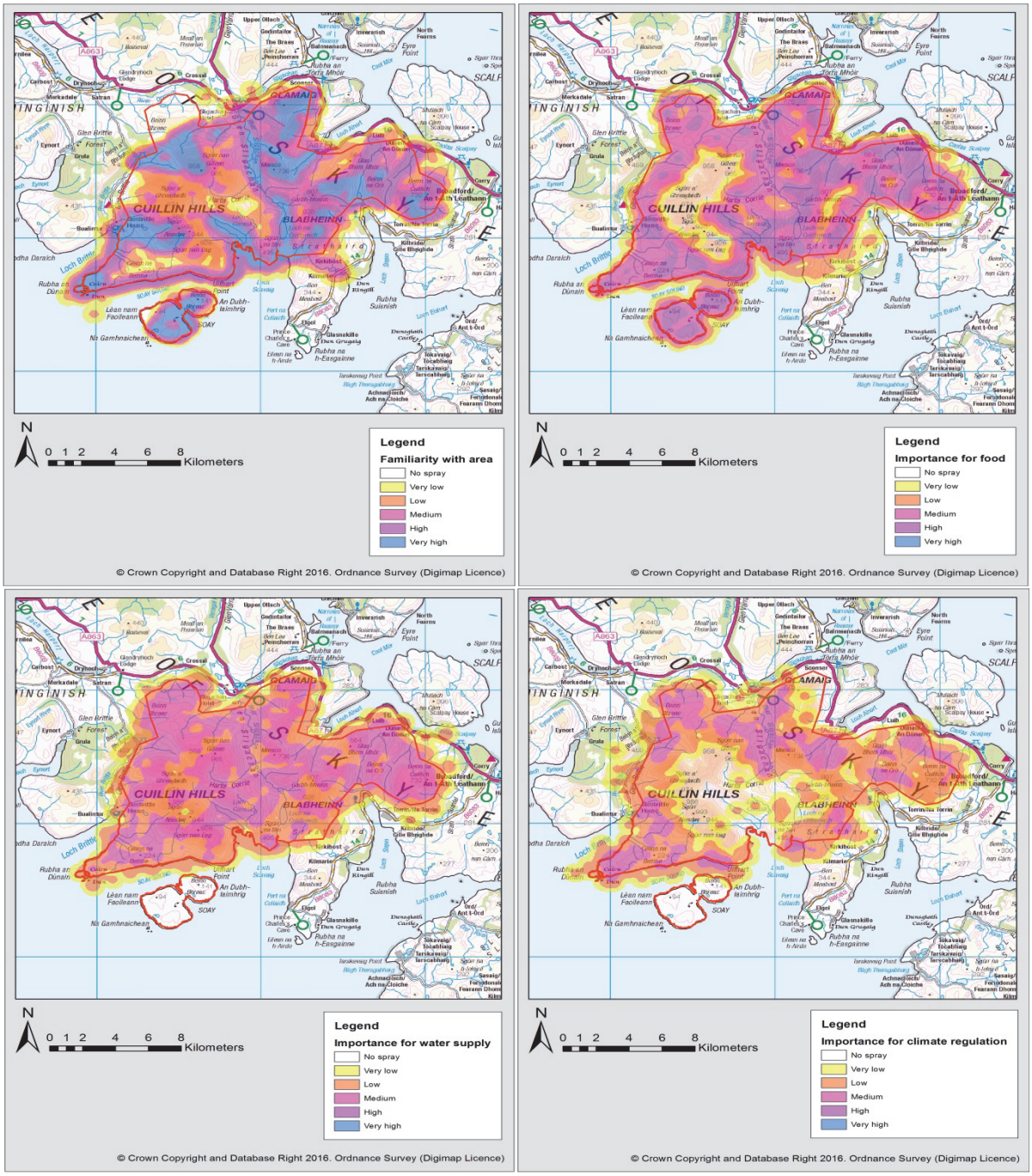
Water is also an influencing factor within the wild land area. Kayaking is popular in the area and allows people to access the more remote parts of the area. Wildlife tours around Elgol and Loch Coruisk are popular attractions for visitors, although to a lesser degree than the Cuillin mountains.

How are ecosystem services provided by the wild land area? (see Map panel 4)

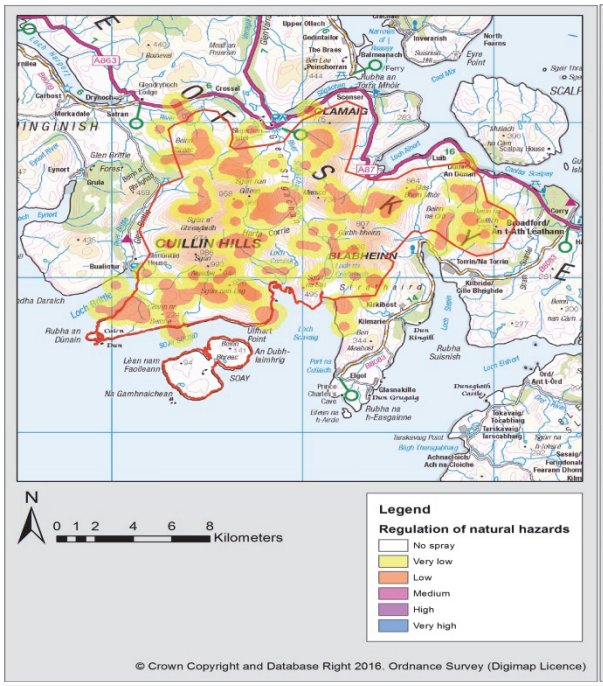
'Wildlife and habitats' are particularly important and across the whole area. Species of conservation significance such as golden eagle breed in the area, as well as other upland birds, e.g. ring ouzel, dotterel, and ptarmigan. The rugged aspect of the area provides a refuge for species prone to disturbance and interference. However, high sheep numbers limit the spread of natural scrub and tree regeneration. The extensively managed sheep and cattle in the area provide a source of meat which is considered 'natural' due to a low input of agrochemicals. The whole area is considered important for the supply of clean drinking water, which requires little treatment. The undisturbed peatland resource is considered an important area to preserve for climate regulation'. 'Regulation of natural hazards' is not considered to be particularly important by respondents. 'Tourism and recreation' are of high importance in the Cuillins and attract people who enjoy wild areas and adventure sports. The reported importance of 'cultural heritage' is patchily distributed. Comments suggest limited cultural importance as the area was traditionally sparsely settled, but the mountains feature in many of the traditional songs of the area and there are well documented archaeological features such as the chambered cairn near Beinn na Caillich.

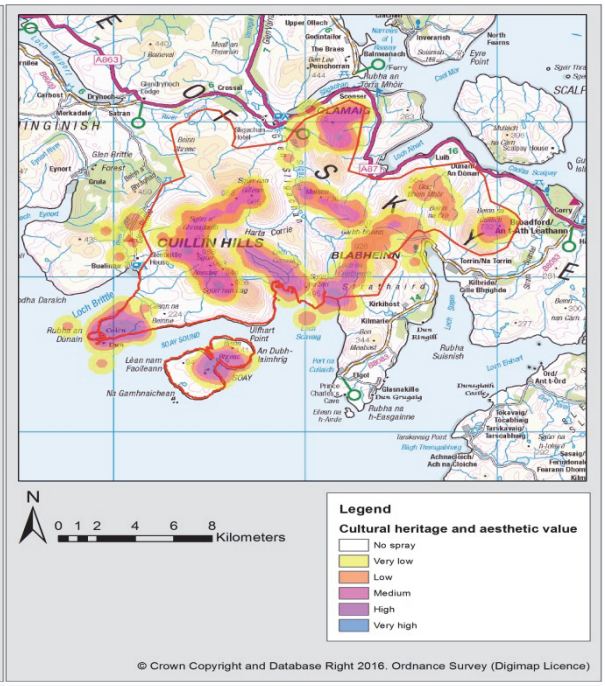
Case study: Cuillin

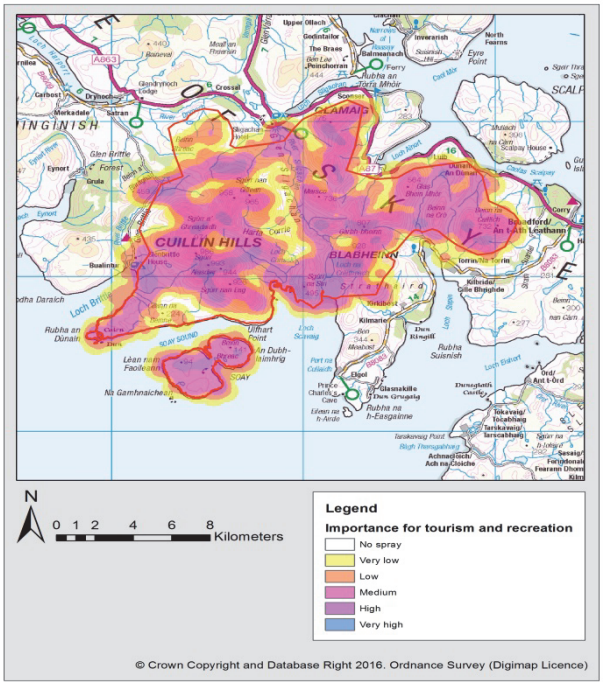
Map panel 5: Cuillin. Familiarity with area and the importance of area for food production; water supply; climate regulation; natural hazard regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 3 responses).

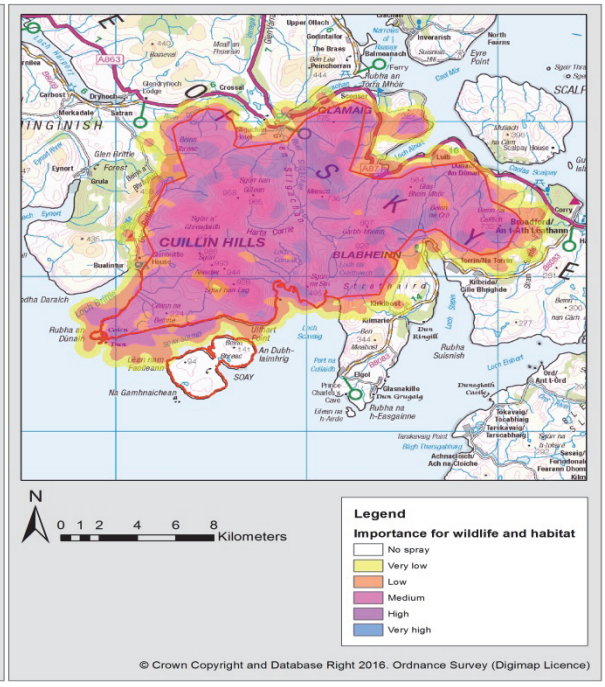


Case study: Cuillin









Case study: Harris-Uig Hills

General information about wild land area	
Case study name	**Harris-Uig Hills**
Description of participants	*Morsgail Estate (private estate)* *Scottish Natural Heritage (Argyll and Outer Hebrides area)* *North Harris Trust (community owned estate)* *Blue Reef Cottages (local tourist accommodation business)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ This area is viewed as exceptionally special within a Scottish context due to its wild and remote qualities. These qualities need to be recognised and valued. ➢ The wildness qualities can make living in the area difficult, however being able to go into these landscapes enhances quality of life. ➢ There is a feeling of belonging to the landscapes and the area.
	Community
	➢ Tourism is important to the economy of the area with other core industries seeing some decline. Wildness is an economic asset to the area through tourism. ➢ Wildness qualities contribute to a growth in 'Green Tourism' as these qualities are promoted, attracting people to experience them. ➢ People come to the area in part because of the varied landscapes, e.g. beaches and mountains. The wildness of the landscapes is relatively unspoilt which is a major draw for tourists, including hill-walkers, birdwatchers and artists. ➢ Estates within the area provide employment throughout the year to help manage the land, as well as seasonal work, e.g. guest houses and lodges.
	Wider Society
	➢ There are parts of the area where you will 'not see a soul'. This feeling of remoteness and isolation is valuable for the health and wellbeing of people. ➢ Tourism activities within the area include mountain biking, walking, fishing and some water based activities, e.g. sea kayaking. ➢ Being able to access the area and simply to know that it exists is highly valued by wider society.
Constraints	**Personal**
	➢ Overall, interviewees do not believe there are negative impacts for them personally. One interviewee, however, highlighted that there needs to be a balance between the needs of the local people and the management of the land.
	Community
	➢ 'Wild land' and 'wildness' can be difficult concepts for people to understand; 50-100 years ago, vibrant and active communities lived in the area. ➢ Familial connections to the landscape can be a cultural barrier to the notion of wildness.

	➢ Wildness can be seen as a potential barrier to development, e.g. agricultural activity and buildings, and people living in the area. Furthermore, there is a complex planning context in the Outer Hebrides, due to the number of different designations in place. This has prevented some developments, e.g. renewables, from being taken forward. ➢ The population within the area is decreasing. There is a need to retain people in order to sustain the community. If development is prevented, people may not want and/or be able to stay. ➢ Economic benefits are seen more broadly within the larger settlements out with the area, e.g. Tarbert.
	Wider Society
	➢ Some feel the wildness qualities such as remoteness and naturalness may limit every day recreational activites e.g. dog walking, as some areas are perceived as inaccessible and inhospitable. ➢ Though access to tourists is not restricted, there is an increase in people wishing to take motocross bikes and other offroad vehicles into the area. This has the potential to damage the land. These activities are limited to maintain the wildness qualities. ➢ There are some tourist 'hot spots' within the area which may affect the experience of the wildness qualities for some.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Sporting estates – deer management	Sporting estates generally do not detract from the wildness qualities as they promote remoteness and other wildness qualities of the area to their stalking clients. This is a unique selling point for the sporting estates in the area.
Community Trust land – conservation management	The community-owned land covers a large part of the area. There is a combination of management interests, including: habitat management; deer management; native woodland improvement; and path access. Collectively, these management practices are perceived to enhance the wildness qualities.
Crofting	There is a risk of overgrazing if stock numbers increase but, in general, crofting does not detract from the wildness qualities.
Aquaculture	This industry detracts visually from the wildness qualities in the west of the wild land area.
Tourism management	As a tourism-based economy, Harris (and the Outer Hebrides more broadly) needs local tourist spend. Activities, experiences and 'spectacles' need to be created or promoted to attract people. Wildlife hides have been placed in different parts of the area and these are sited sensitively. To a degree, the hides may detract from the wildness qualities and 'sacrifice the wild feeling' but they also help support wildlife through management. Education of tourists about the landscapes is part of this.
Access – path maintenance	Paths can detract from the wildness qualities but they are beneficial in allowing people to access the wild land area.

Case study: Harris-Uig Hills

Do wild land qualities benefit or impinge on management activities?

The wildness qualities are unlikely to be a major influence on land management. There is a feeling that many land management practices within the area have remained unchanged for a long time, e.g. crofting and deer management. These practices have helped to shape the landscape and the wildness qualities experienced today.

Facts and figures about the wild land area

- There has been media coverage of the area and television programmes e.g. 'From Harris with Love', 'The Great Climb' and 'Castaway', which allows the area to be seen by a wider audience.
- Interviewees estimate that there have been significant increases in tourist numbers in the area in recent years.

General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

There is a tension between the economic value of the land as a resource and understanding how wild land and the associated wildness qualities will bring economic benefit to the area. The perception exists amongst some people within the local community that wild land is a potential barrier to development. Management within the area incorporates community engagement initiatives and collaboration with different local groups, e.g. voluntary days and tree planting.

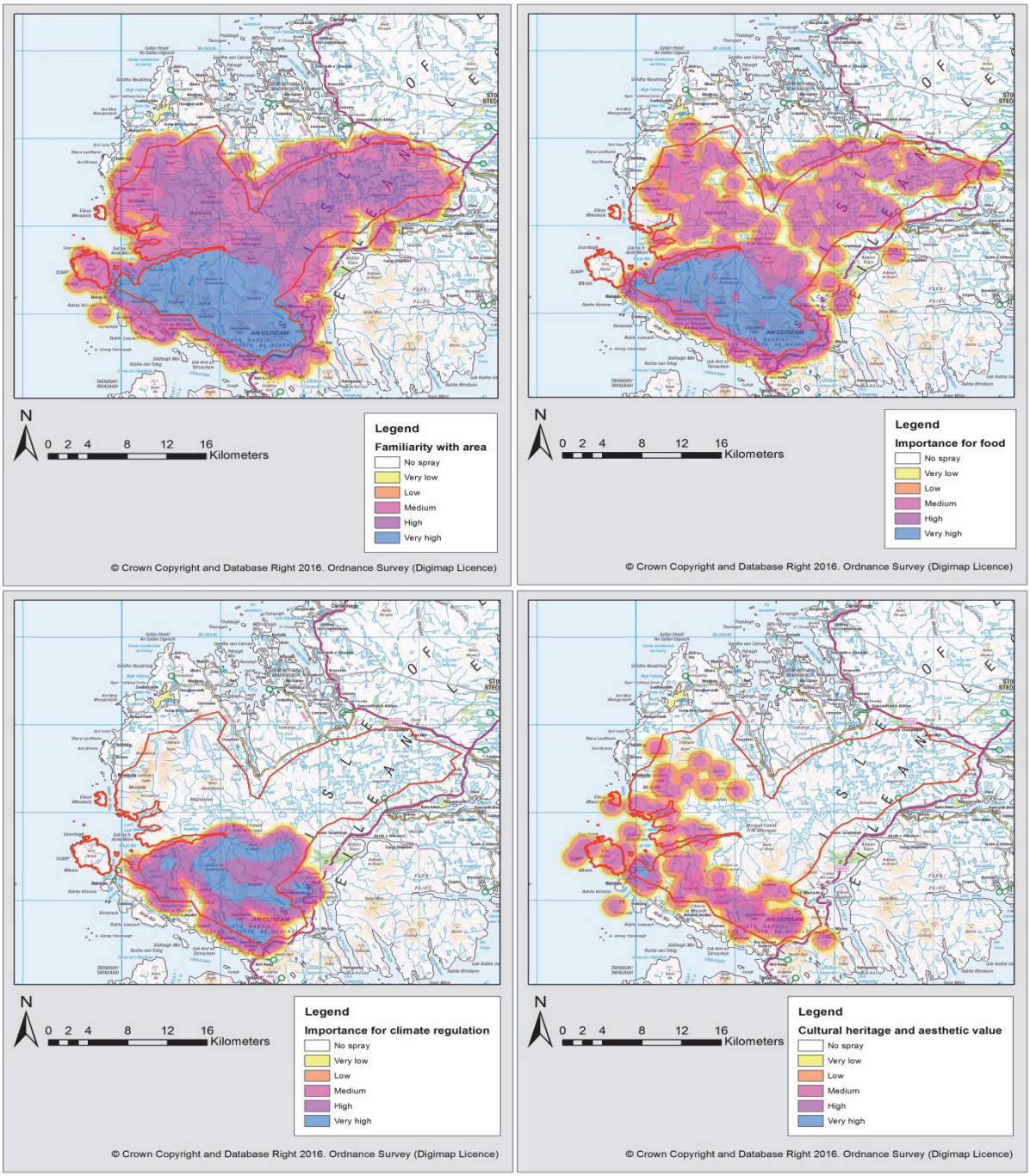
Due to the remoteness and coastal nature of the area there are also sea-based sports and tourism, e.g. sea kayaking. This allows people to access the more remote parts of the area. If this increases it may put pressure on the area's wild character.

How are ecosystem services provided by the wild land area? (see Map panel 5)

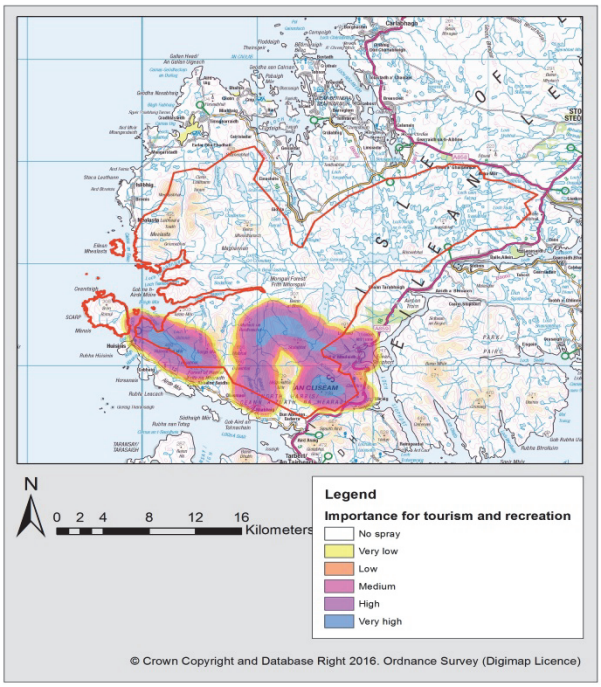
Ecosystem service provision is perceived as most important in the southern part of the wild land area. There is a very important area for 'wildlife and habitats' in the south, with most of the remaining area being classed as important or moderately important. Animals and plants that are sensitive to disturbance are protected by the remoteness of the area and the associated lack of disturbance. Furthermore, the extensive nature of management across the area provides very favourable conditions for wildlife to thrive. A range of species and habitats of conservation importance are present in the areas indicated on the map, e.g. golden eagle, black-throated diver, blanket bog and heath habitats. 'Food production' is also viewed as very important or important across much of the area. The North Harris and Uig hills are important for venison production and the area to the north east is reportedly the most important for sheep grazing. However, comments also indicate that the area has remained rugged and sparsely inhabited over time due to the unsuitability of the land for agricultural or other development. There are valuable peatland resources in the area and these are recognised as valuable carbon stores with a high capacity for 'climate regulation'. The most prominent areas of blanket bog are highlighted on the map. Again, this resource is protected by its remoteness and the absence of disturbance. The area is also thought to be valuable for water absorption, reducing the risk of flooding problems, although this was not generally perceived as a significant hazard in the area. The wildness qualities of the area bring visitors to what is quite a remote destination and the wild land area is hence very important for tourism. However, the parts of the area actually used by visitors are limited to those accessible by core paths or particular landmarks such as Clisham (An Cliseam), the island's highest summit. In terms of 'cultural heritage', the area has an important history of crofting and the map reflects the areas in which this activity was prominent before the coastal areas were cleared of people, as well as showing places where communities now exist. The wild qualities of the land have made this a challenging area for people to live and work, both historically and currently, leading to community decline.

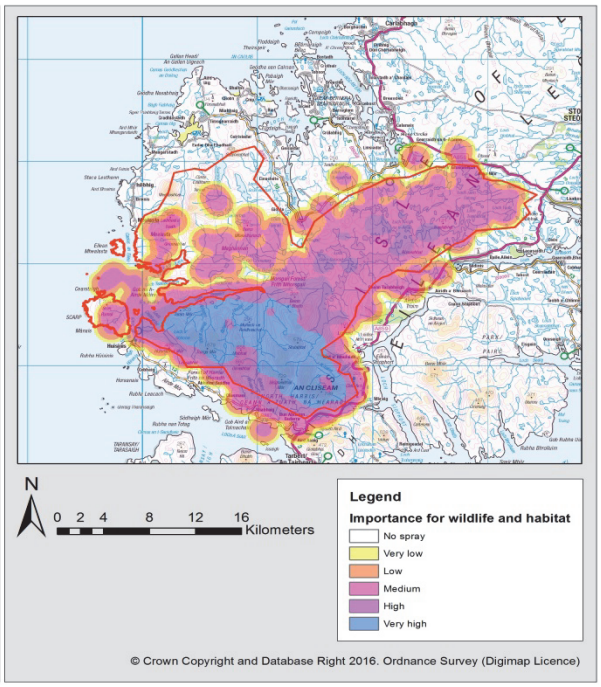
Case study: Harris-Uig Hills

Map panel 6: Harris-Uig Hills. Familiarity with area and the importance of area for food production; climate regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 3 responses).



Case study: Harris-Uig Hills





Case study: Merrick

General information about wild land area	
Case study name	**Merrick**
Description of participants	*Forestry Commission (Galloway Forest District)* *Scottish Natural Heritage (Southern Scotland operational area)* *Local Authority Environment team* *Walking Festival (local, volunteer led festival)* *Southern Uplands Partnership (partnership scheme between local people, government bodies, agencies and local councils)* *Craigengillan Estate (private estate)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ People enjoy a sense of exploration from being in the wild land area. ➢ People are able to experience solitude within the area. The area around the loch has few paths, enhancing the wild experience. ➢ There is recognition of the historical management of the landscape and how it has shaped the area and its cultural heritage. ➢ The wildness qualities of the area contribute to a spiritual experience.
	Community
	➢ Tourism in the area contributes to sustainable development and the wildness qualities are central to promoting the area and encouraging tourists to visit. ➢ Nature-based tourism is important for promoting the area (e.g. 'Wild Seasons') and helps to raise awareness of the diversity of wildlife and habitats within the area. ➢ Emptiness of the land has enabled the 'Dark Skies' designation, which may attract more people to the area. ➢ Glentrool community (close to the Merrick) is working towards becoming a bio-community, using their local resources and environment. ➢ The landscapes surrounding the Merrick are felt to be part of the identity of the people within the area.
	Wider Society
	➢ Nature-based organisations in the area use wildness qualities to promote the benefits of outdoor recreation to society. ➢ There are underlying health and well-being benefits for people experiencing the wildness qualities of the area and getting away from everyday life. ➢ The area is not an easy place for walking, with only sheep tracks in some areas. Although not as high or as remote as other Wild Land Areas, the terrain is challenging, which adds to the overall wildness experience. ➢ This is an internationally important place, in particular through the designation of the Galloway and Southern Ayrshire Biosphere Reserve. This is perhaps not always recognised at the national and local level. ➢ It is felt that the main role of Wild Land Areas is to promote the value

	of wildness qualities and their benefits to society, leading to a greater understanding of how land might be managed in other areas.
Constraints	**Personal**
	➢ Interviewees generally do not believe there are negative impacts to them personally. ➢ Some individuals may be put off from visiting the area due to its 'wildness' and concerns about the associated lack of facilities.
	Community
	➢ There are potential sensitivities associated with the 'branding' of the wild land area and wildness qualities, particularly in relation to the 'remoteness' of the area, which might have a negative impact on attracting long-term residents. ➢ The areas adjacent to the wild land area are also valued for their wild character and it was suggested these should be recognised and taken into account in terms of wild land and management planning. ➢ Employment opportunities in the area are largely restricted to tourism, which is viewed by some as limiting community development. ➢ There are concerns that a greater emphasis on native woodland planting will reduce jobs in commercial forestry, which is a significant industry in the area.
	Wider Society
	➢ Overall, interviewees do not feel that there are negative impacts of wildness qualities on wider society. There is a potential for conflict between access and path maintenance and the wildness qualities of the area. It is felt that a balance between access requirements and wildness needs to be achieved.

Management Activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Forestry – commercial timber	The unnatural structure of commercial forestry plantations is thought to detract from the area's wildness qualities.
Forestry – native species planting	Native woodland reduces the obvious visual impact of people and enhances wildness overall
Peatland habitat restoration	Peatlands were once drained and overgrazed but there is now ongoing restoration as a result of more holistic thinking about land management. This enhances wildness and ecosystem function.
Renewable energy schemes	Wind farms are perceived as detracting from wildness qualities as they are obvious human artefacts. Some interviewees believe that the schemes bring local economic benefit but that the development of schemes has reached a 'saturation point' in the wider Southern Uplands.
Hill farming	The current low intensity nature of hill farming does not impact on wildness qualities.
Access/paths	There are few signed paths in the area apart from on the Merrick hill, which enhances the wild experience. Paths and fences are in place in some areas which can detract from

	wildness, but they also help to protect the area from erosion which outweighs the negative impact.

Do wild land qualities benefit or impinge on management activities?

The topography of the land limits what can be done within the area and therefore the management that takes place within it. Management within the area is thought to represent the 'best possible use' of the land as it would not be productive for more intensive use. The wild land area inspires people and has been an important part of the local biosphere reserve designation process.

There is some concern around the implications of a high number of local planning proposals for wind farms. There has been extensive wind farm development in the Southern Uplands and a growing number of schemes close to the wild land area could have a significant negative impact on the wildness in the area.

Facts and figures about the wild land area

- Part of the Southern Upland Way route is within the wild land area; in 2007 the figure for walkers counted in the western section of the route was 36,478 (Southern Upland Way website).
- Around ten years ago an estimated 25,000 people were counted in a year using the Merrick path.
- The wild land area forms the majority of the 'core' area of the biosphere reserve.
- The wild land area is also part of the Galloway Forest Park.

General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

A key message from the interviewees is the need to make the objectives of the wild land area meaningful within the local area. There is also a need for wider awareness and understanding so that the wildness qualities of the area can be better utilised and promoted by local businesses. The biosphere reserve designation, NNR, Galloway Forest Park, SSSIs and SACs exist already within the area, reiterating the need for better connectivity and understanding around how these can provide tangible benefits to local people.

The Merrick area is quite unique, particularly within the context of the Southern Uplands. It has habitats and qualities that are akin to the Highlands – rocky and loch-strewn landscape (albeit on a smaller scale) – which can be an unexpected feature for visitors to the south of Scotland. The wild land area and the biosphere reserve designation help to demonstrate to local people that these landscapes are important assets to the local area.

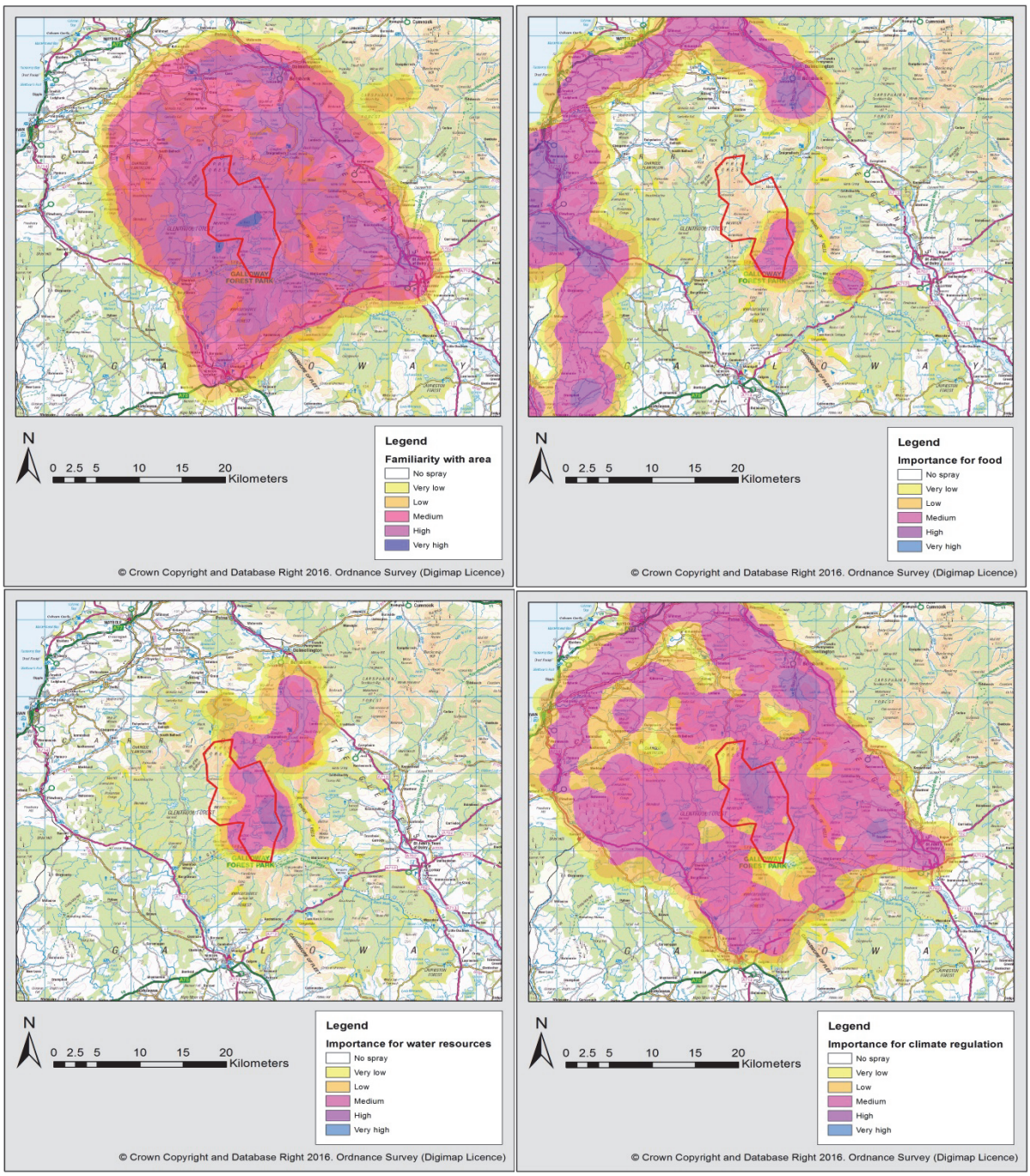
How are ecosystem services provided by the wild land area? (see Map panel 6)

Medium to high levels of importance are associated with 'climate regulation', 'cultural heritage' and 'wildlife and habitats' across the majority of the wild land area. The prevalence of peatland in the area is important for climate regulation and regarded as globally important for carbon sequestration. Forestry also provides climate regulation, particularly with the increase of native woodland species. The ruggedness of the hills is highly appealing, as are cultural heritage links to Robert the Bruce, the wars of Scottish Independence and past uses of the land as hunting grounds for the Red Comyn. The Silver Flowe wetlands (where peatland restoration is taking place) and Merrick are of particular importance for wildlife and habitats in the area. The lack of disturbance by people and development benefits particular species and habitats, such as golden eagle and raised bogs. In general, low to medium levels of importance are associated with 'food production' in low density hill farms in the southern part of the wild land area, with most activity related to this ecosystem service outside the area, along the coast. Medium to high levels of importance are associated with 'water supply' in the central and southern parts of the wild land area. Lochs and rivers (e.g.

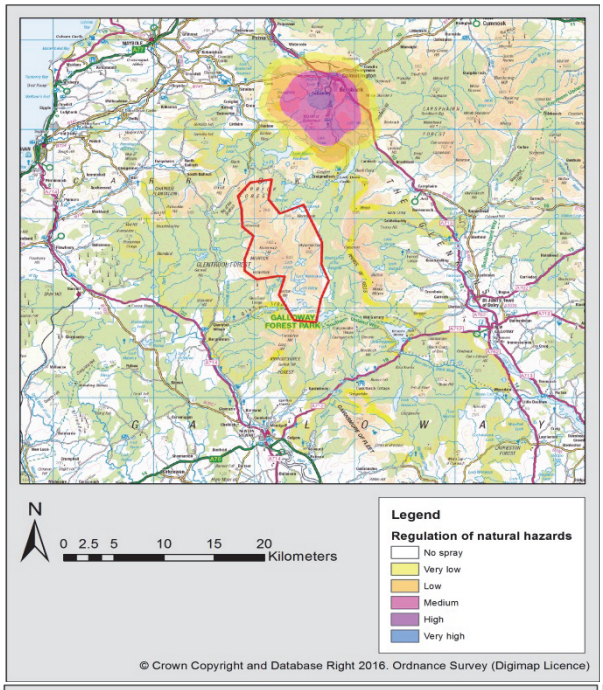
Loch Doon) are part of larger river catchments which supply hydro outside the area. Medium to high levels of importance are associated with 'tourism and recreation' *outside* the wild land area, recognising the attraction of the biosphere reserve and Galloway Forest Park more broadly than the wild land area in particular. No importance is associated with natural hazard regulation in the wild land area, although medium to high levels of importance are associated with natural flood management provided by the Bogton Loch SSSI outside and to the north of the wild land area, where flooding occurs for a few days each year. It is interesting to note the prevalence of sprayed areas outside the wild land area boundaries. This suggests potential to expand the boundaries to encapsulate the importance of these ecosystem services and associated wildness qualities.

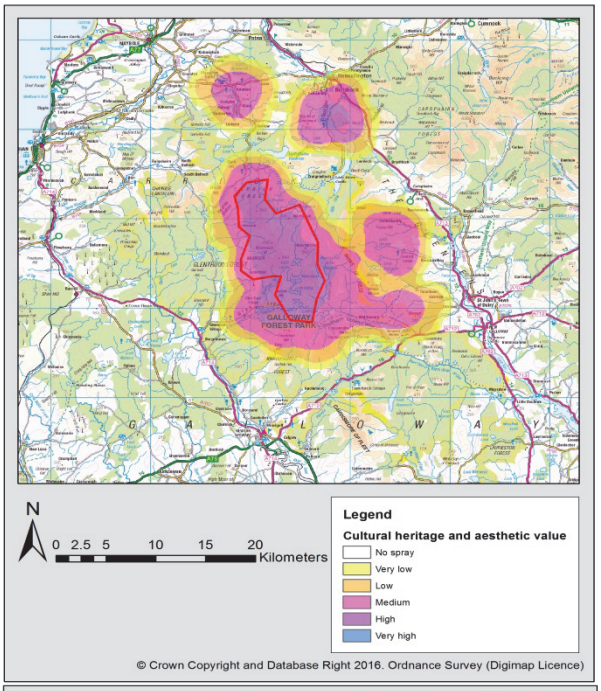
Case study: Merrick

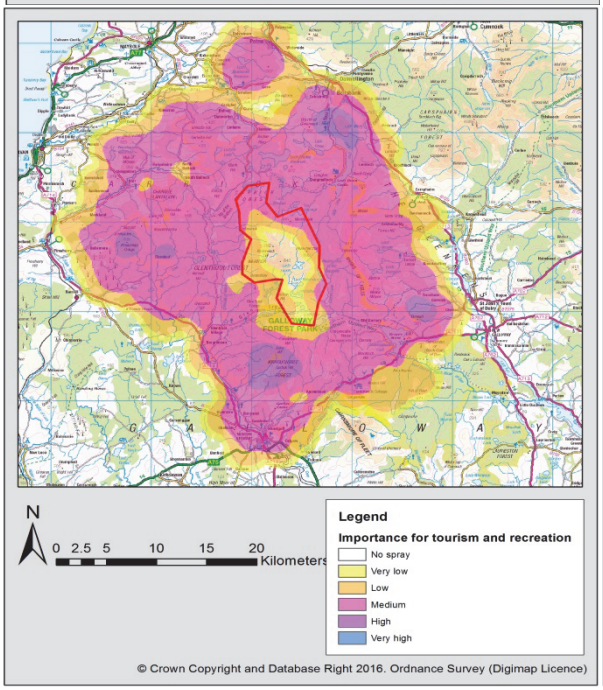
Map panel 7: Merrick. Familiarity with area and the importance of area for food production; water supply; climate regulation; natural hazard regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 5 responses)

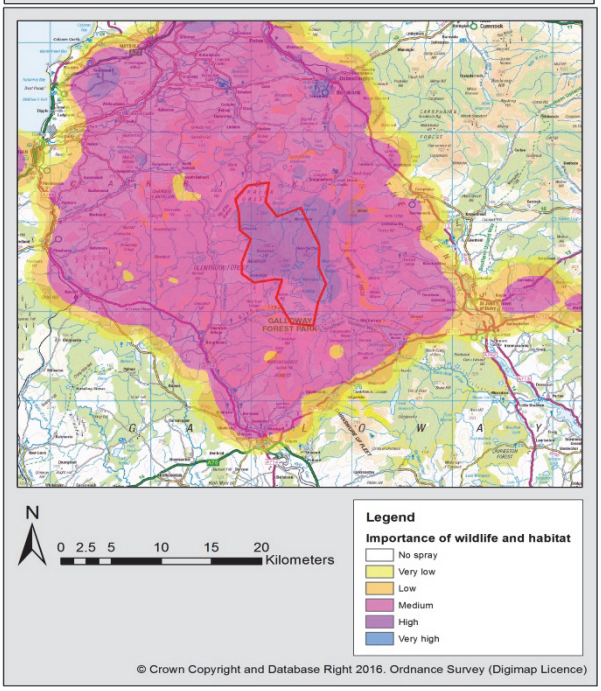


Case study: Merrick









Case study: North Arran

General information about wild land area	
Case study name	**North Arran**
Description of participants	*Arran Access Trust (Non Governmental Organisation addressing land access issues on Arran)* *Arran in Focus (local photography business)* *National Trust for Scotland (Brodick and Goatfell)* *Community Council* *Farmer* *Lochranza Field Studies Centre (local business providing field study courses and outdoor activities)*
Benefits and constraints of Wild Land Areas	
Benefits	**Personal**
	➢ The remote nature of North Arran means the hills are generally quiet (with exception of Goatfell). ➢ The psychological and emotional benefits are described as priceless. People benefit from the restorative value and a sense of vulnerability from being in a landscape with no visual signs of man. ➢ Within ten minutes, it is possible to feel no trace of human presence. This provides a valuable form of escapism for people. ➢ The area has a high aesthetic value that can be experienced without going into the wild land area e.g. proximity to high road passes.
	Community
	➢ There are economic benefits from the tourist industry. Many returning visitors are attracted by the North Arran landscape and its wildlife. ➢ Income from the summer tourist season allows many hotels to remain open all year, thereby providing social benefit to communities over winter. ➢ The clean air of the area is good for physical and mental health. ➢ There are many opportunities for outdoor recreation e.g. walking, climbing. ➢ There is minimal light pollution. ➢ Many people retire to north Arran and value its tranquillity.
	Wider Society
	➢ North Arran is a unique area in Scotland and is described as 'Scotland in miniature'. ➢ The wildlife and diversity of the area thrive due to habitats present and lack of disturbance: People can visit and find the 'big five': red squirrel, red deer, harbour seal, otter and golden eagles. The ruggedness of the terrain protects the environment. Those seeking inaccessible areas are usually respectful of the environment and unlikely to cause damage. ➢ It is important for people to know that such Wild Land Areas are there, i.e. their existence value, even if they don't visit. ➢ Arran has changed little and it is considered important that

	Scotland has some areas that retain their character over time.
Constraints	**Personal**
	➢ There is erosion in some parts of the wild land area but this is a manageable impact. ➢ There is pressure to provide more facilities and infrastructure for tourists which could have negative impacts on the wildness of the area e.g. signage, disabled access.
	Community
	➢ The lack of paths and bridges can cause some problems for tourists in terms of route finding and river crossings. There is some damage from walkers crossing fences and roaming across the land. Tensions over access might be reduced with an improved path network. ➢ Some people believe that there could be benefits from having more renewable energy schemes and that limitations due to landscape protection may be negative.
	Wider Society
	➢ Various industries use the wild qualities of Arran (mountains and sea imagery) to market products e.g. whisky, soaps and body creams produced by Arran Aromatics ("fragrances inspired by the landscape and scents of the island"). ➢ Wild land needs to be managed, albeit at low intensity, for the use and enjoyment of the area for a wide range of people. Reducing management too much can lead to problems such as overgrown and rank vegetation and an increase in tick numbers.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Deer management	Lower deer numbers would allow more re-vegetation enhancing wildness qualities. Deer numbers are perceived by some to be too high with overgrazing a negative impact. Deer management through the local deer management group helps to preserve wild land qualities.
Use of water in the Isle of Arran distillery	The high quality and distinctive taste of the water is important for the distillery.
Forestry plantation	The presence of planted forestry is thought by some to increase the attractiveness of the area. Woodland extraction can detract from the wildness of the area due to the noise and presence of large logging lorries on small roads, and through the displacement of wildlife from plantation.
Broadleaved woodland planting on fringes of area	Woodland in the foothills enhances wildness.
Protection of remnant woodland using deer fencing	The fencing detracts from wildness but will have long-term benefits for woodland and will be removed in 30 years.
Control of bracken (by spraying from	The challenges of bracken control detract from the wildness of the

helicopters)	area.
Pheasant pens	The management of woodland areas for pheasants detracts from a sense of wildness.
Footpath maintenance	Maintenance prevents erosion by encouraging people to remain on paths. The aesthetic quality of footpaths is considered and only local materials are used for their construction to ensure they blend into the landscape and retain a 'mountain feel'.
Bog restoration	There is work ongoing to re-float bog habitats which will enhance wild character. There are big scars in some places from drainage schemes which would benefit from repair work.
Reintroduction of Black Grouse	A breeding programme for black grouse has allowed this species to be reintroduced to Arran with the aim of establishing a breeding population, enhancing biodiversity.
Decline in livestock in some hill areas	Vegetation can become rank in areas where grazing is very low. Bracken and heather dominate and wildfire is a hazard. Such areas become inaccessible to walkers as vegetation is too dense.
Event management	Large scale mountain events are carefully managed in the wild land area as having large numbers of people in the landscape at the same time could impact on the experience of other visitors to the area. There are only about three large events per year. Efforts are made to encourage people to access the area in small groups.

Do wild land qualities benefit or impinge on management activities?

Deer stalking is an important industry. The landscape of North Arran enhances the deer stalking experience of visiting clients.

The wild land area is relatively unproductive. Lambs produced in north Arran are fewer and considerably lighter than those produced in the south of the island, despite the north being much larger in scale.

There are relatively few potential land uses in the wild land area. In agricultural terms the land can only be improved through drainage.

Facts and figures about the wild land area

- 20,000 walkers ascend Goatfell every year (Arran Access Trust).
- No infrastructure in wild land area besides one small hydro scheme.
- The scenery/landscape is the foremost reason visitors go to Arran (Visit Scotland visitor survey 2012).
- The Lochranza field studies centre has hosted thousands of students allowing them to experience the qualities of the wild land area. Approximately 2,500 students visit annually.

General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

There has been conflict between landowners and recreational users in the area in the past which led to the Arran Access Trust being set up. This has worked to resolve some of these issues as well as to restore paths in the area. Tourism is a major industry in the area and therefore access to the wild land area is recognised as important. Arran is described as 'Scotland in miniature' and is marketed as such in various guidebooks. This makes it an attractive and manageable tourist destination. Arran is very accessible from the Central Belt

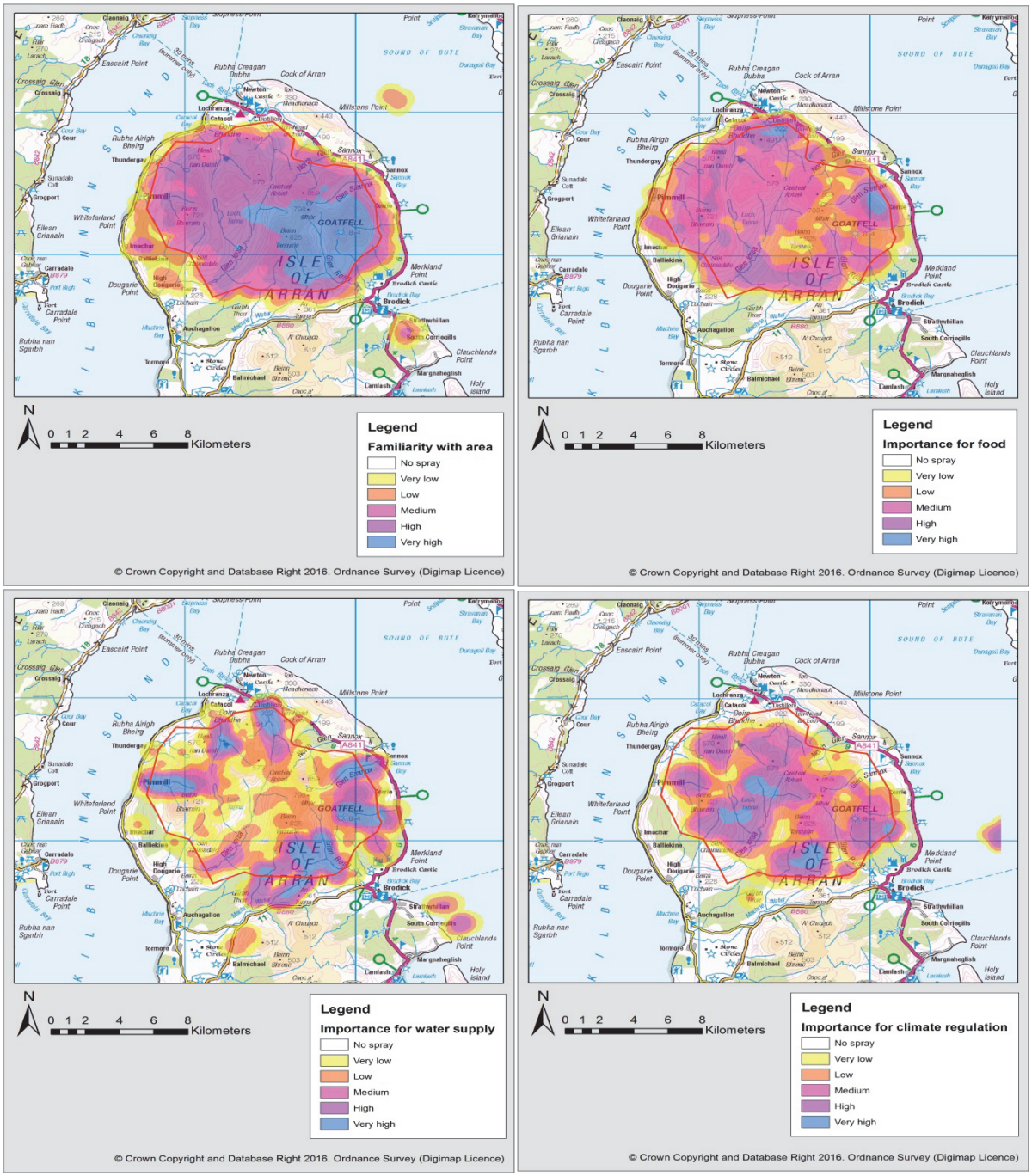
and offers a unique range of landscapes in a compact area with a juxtaposition of the steep mountains in the east of the area with more rounded hills in the west. Arran is considered the most southerly representation of a highland landscape. The high geological diversity of Arran attracts many geologists. The environment can be enjoyed from nearby roads. The combination of mountain and coastal landscapes also adds to the unique character of North Arran with the views of other islands such as Jura also enhancing this. The rich biodiversity was also described including the Arran whitebeam (endemic to Arran) which only exists in the glens of North Arran. Landowners wish to maintain high deer densities for stalking while overgrazing is viewed as an issue by others.

How are ecosystem services provided by the wild land area? (see Map panel 7)

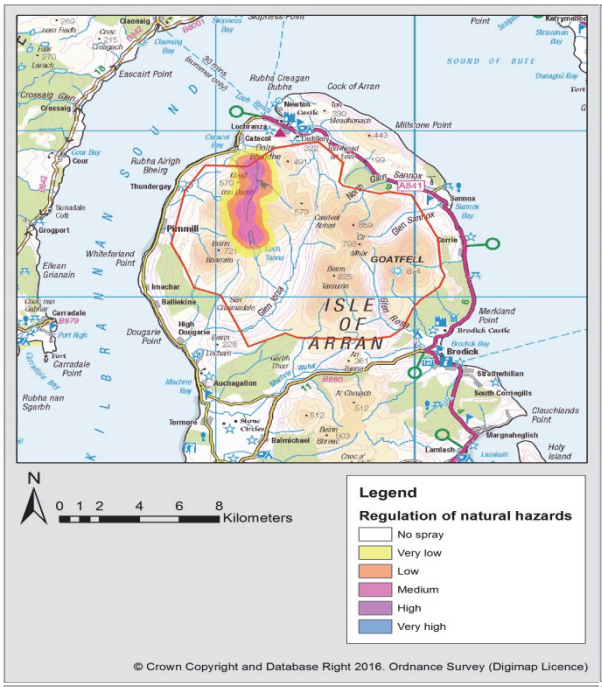
A wide range of ecosystem services are provided across the wild land area. High levels of importance are attached to 'tourism and recreation', and 'wildlife and habitats', with a considerable core area of very high importance of both to the north and east of the area. The large majority of visits made to the area are for walking and other forms of recreation, with clear economic benefits to the local community. The remote yet accessible character of the area provides an excellent opportunity for people to 'get away from it all' and experience wildness qualities. Successful breeding of bird species is also seen as linked to the character of the area. Some bird species, such as nesting red throated divers, benefit from the lack of human disturbance in remote lochans with poor access. Nesting eagles have adapted well to recreation in the area. Further management of the deer population would improve diversity of wildlife and habitats in the area. Medium to high levels of importance are attached to 'cultural heritage', and 'food production'. However comments explain that food production is limited to some sheep grazing and venison. Indeed, there is minimal evidence of human artefacts in the landscape, suggesting that agriculture has not been a significant activity in the area. Most people live and work near the coast. High levels of importance for climate regulation are associated with the carbon sequestration provided by peat across the area. Peat may also help to prevent flooding and landslips, although 'regulation of natural hazards' is perceived as less important across the whole area. High levels of importance are attached to 'water supply' in the immediate vicinity of river catchments. The quality of the drinking water is considered very high, with some local people relying on private bore holes for their supply.

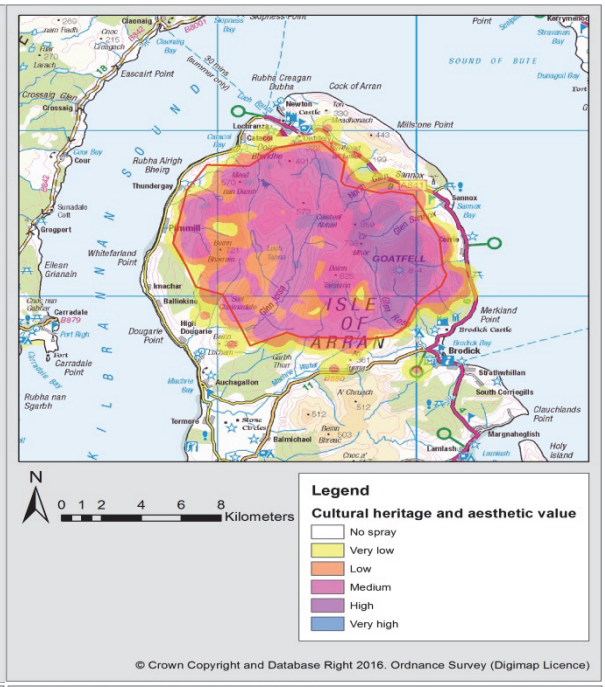
Case study: North Arran

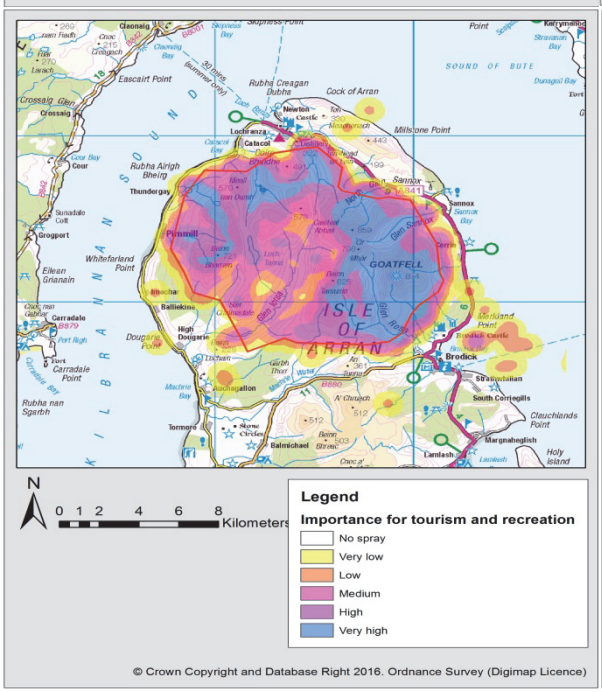
Map panel 8: North Arran. Familiarity with area and the importance of area for food production; water supply; climate regulation; natural hazard regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 3 responses).

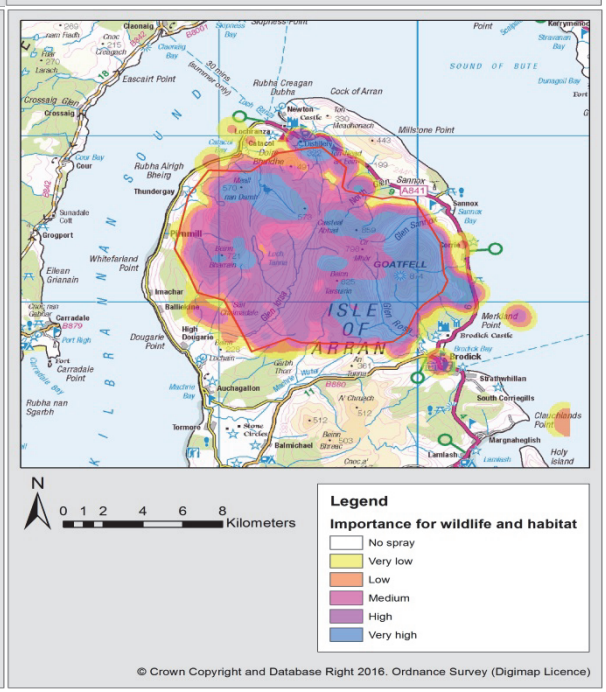


Case study: North Arran









Case study: Rannoch-Nevis-Mamores-Alder

General information about wild land area	
Case study name	**Rannoch-Nevis-Mamores-Alder**
Description of participants	*John Muir Trust (NGO landowners)* *Community representative* *Scottish Natural Heritage (South Highland operational area)* *Nevis Partnership Scheme (local environmental collaborative initiative including community landowners and government agencies)* *Highland Mountain Company (local climbing and guiding business)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ People enjoy going out regularly in the wild land area to observe the natural landscape and appreciate its seasonality. ➢ Being able to experience the open space and look out at natural areas and natural landscapes helps create feelings of peace and well-being. ➢ Ease of accessibility to the wild land area is important to experience the wildness qualities. ➢ Experiencing this area encourages greater understanding of the connection people have with the land.
	Community
	➢ Due to there being fewer obvious human artefacts and features in the landscape, it can be daunting for people unfamiliar with the area to set off alone. Many visitors like to have a guide to walk them through the landscape so they can benefit from their local knowledge; this benefits local guiding businesses. ➢ Those working within the wild land area; farmers, land owners, foresters and tourism businesses, all benefit from having the wildness qualities that can be used in marketing their businesses. ➢ Skiing tourism during the winter months extends the tourist season within the area, bringing further economic benefits.
	Wider Society
	➢ Tourists usually find the area very different from where they live. The grandeur and ruggedness of the area is what draws people to the area. ➢ Being outdoors in the area promotes a healthier lifestyle and encourages broader awareness of the social and health benefits of being in the landscape. ➢ There are iconic landscapes within the area. These are used to promote Scotland more broadly as a tourist destination and the wildness qualities of the areas are integral to this. ➢ Filming for an international television series (‘Outlander’) took place in the area, promoting the area to a wide audience.
Constraints	**Personal**
	➢ It can be physically demanding to be out in this area, particularly in the winter. As this is part of the experience of the wildness of the area, this may be considered a benefit, but uninitiated visitors might often

	find this difficult and perceive it negatively.
	Community
	➢ Internet connections and phone signal can be poor in the area, which can have negative impacts for local businesses. ➢ There are few job opportunities in the area and these are generally restricted to the land and tourism industries. As a result, young people tend to leave the area when seeking employment.
	Wider Society
	➢ There is a lack of woodland in the area, due to ecological damage caused by overgrazing. There is a reluctance on the part of some to alter the landscape (e.g. by planting native trees) as the recognisable 'bare' quality of the mountains is considered important.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Deer Management	High deer numbers have negative impacts on habitats in the area. Some issues were raised about deer fencing. Derelict fencing detracts from the visual quality of the landscape.
Forestry	When timber is harvested from commercial forestry plantations, the felled areas and forestry access tracks have a detrimental visual impact on the landscape. Native woodland planting within the area is generally thought to enhance the wildness qualities, e.g. the Future Forests Project. This project included aspen planting and engaged volunteers which raised awareness of the area. The considerable amount of rainfall within the area has led to its description as the 'Celtic rainforest'. The environmental conditions are considered to be conducive to increasing woodland area.
Path management	Path management is necessary due to high levels of erosion caused by high rainfall and shallow soils.
Cairn removal	Removal of cairns is thought to enhance the wildness qualities. It also makes the areas safer as 'official' cairn way-markers are more distinguishable.
Partnerships and collaborative engagement	At the landscape level, management focuses on creating and sharing knowledge about the area, in turn raising awareness of the wildness qualities.

Do wild land qualities benefit or impinge on management activities?

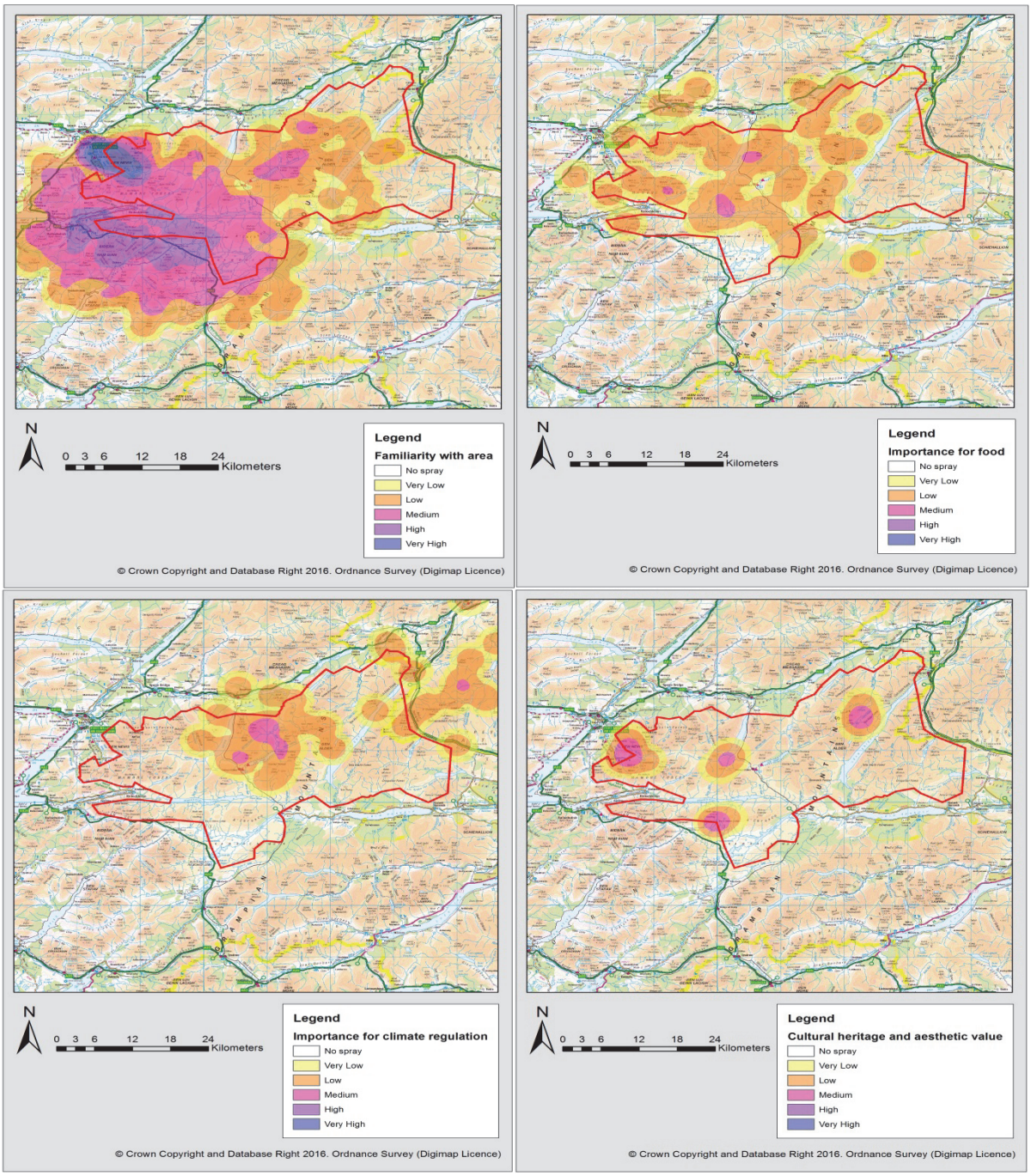
The remoteness of the area affects how it is managed. For example, helicopters are used to transport path construction materials to the summit of Ben Nevis and this can detract from the wild land experience of visitors. Managers often need to access remote areas on foot to manage footpaths, which can be challenging. Wild land is described as having an 'absence of human artefacts' but there are a number of archaeological sites within the area (at least 120). Therefore, there is a historical impact of humans within the landscape. Former management has shaped the wild land area in some respects and this now has an influence on the way wildness qualities are perceived, valued and recognised.

Case study: Rannoch-Nevis-Mamores-Alder

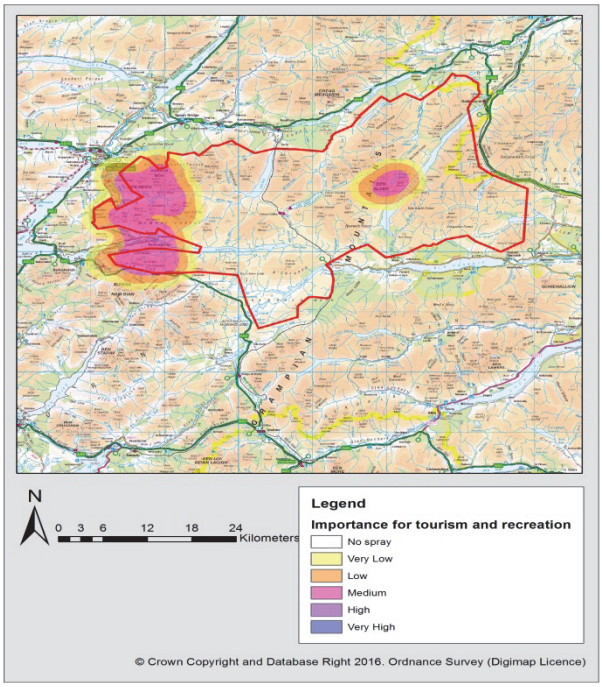
Facts and figures about the wild land area
➢ Over 100,000 people are counted on the Ben Nevis path each year, particularly on the lower sections of the path (John Muir Trust website).
General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)
The area was branded as the 'Outdoor Capital of the UK' in the early 2000s. This label could be used more in the area and linked directly to the wildness qualities. Glen Nevis and Ben Nevis are popular areas with high numbers of recreational walkers and climbers. The Great Glen Way and West Highland Way also pass through the area. The wildness of the area has contributed to the popularity and development of these well-used long distance trails.
How are ecosystem services provided by the wild land area? (see Map panel 8)
The maps highlight how ecosystem services are provided within localised parts of the area. Medium levels of importance are associated with 'tourism and recreation' in the western part of the area, in proximity to the main peaks and glens of Ben Nevis, Glen Nevis and the Mamores, and also around Ben Alder in the eastern end of the area. Medium levels of importance are also associated with the 'cultural heritage and aesthetic value' of four sites in the area: Ben Nevis, the Ben Alder Forest, Black Corries Lodge, and Corrour Station. Low to medium levels of importance are associated with 'climate regulation' in the central and eastern part of the area. This is in reference to peatland present in these areas and the capacity for increased carbon sequestration where disturbance to this habitat is minimal. 'Food production' is seen as having low importance in the area, although this service is prevalent across the area. Low to medium levels of importance are associated with 'wildlife and habitats' in the western half of the area. Again, a lack of disturbance to species and habitats is a key factor.

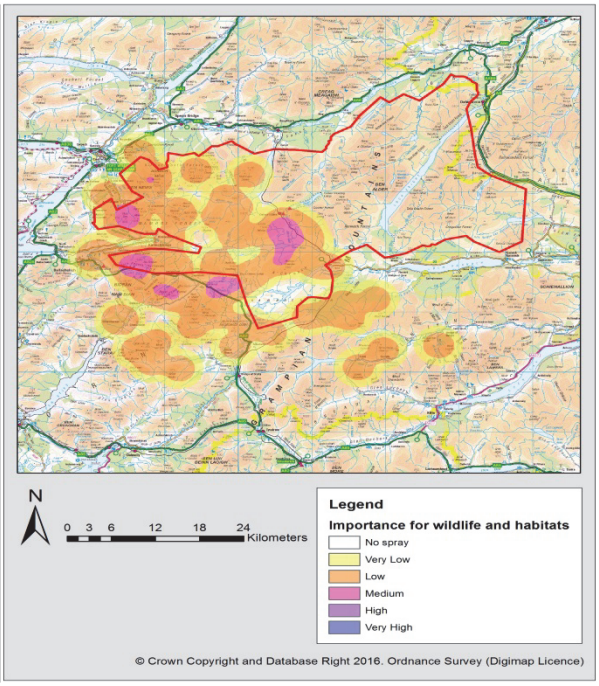
Case study: Rannoch-Nevis-Mamores-Alder

Map panel 9: Rannoch-Nevis-Mamores-Alder. Familiarity with area and the importance of area for food production; climate regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 3 responses).



Case study: Rannoch-Nevis-Mamores-Alder





Case study: Waterhead Moor - Muirshiel

General information about wild land area	
Case study name	**Waterhead Moor – Muirshiel**
Description of participants	*RSPB (reserve management for south and west Scotland)* *Eadha Enterprises (social enterprise based in Renfrewshire looking at socio-economic regeneration)* *Save The Regional Park (campaign group against wind farm development in the Clyde Muirshiel Regional Park)* *Clyde Muirshiel Regional Park* *Hawkshill Estate & Blairpark (private estate)*
Benefits and impacts of Wild Land Areas	
Benefits	**Personal**
	➢ The area is of personal value to interviewees who work locally. ➢ The bleak and barren nature of the area is considered a special quality. ➢ The scenic value of the landscape, e.g. views from Windy Hill, and tranquillity in the wild land area are integral parts of the wildness qualities of the area. The surrounding area looks undisturbed.
	Community
	➢ The area is reported to have 'unrealised potential' for ecotourism and environmental education. It also has potential for ecological restoration which would improve carbon sequestration and natural flood management. ➢ Clyde Muirshiel Regional Park offers volunteering opportunities for conservation and wildlife surveying. The area is also used for Duke of Edinburgh activities. ➢ Aspirations for the area include a desire to see the expansion of the wild land area. There are plans for pylons to be removed in a neighbouring area which could enhance the wider area. The large scale of the area that people perceive as wild beyond the actual wild land boundary adds to its overall value. ➢ The area has important landscape value for local people who appreciate its scenic value from a distance, e.g. while travelling through it. ➢ The area is very accessible by people living in highly populated surrounding areas and has recreational value for people in these areas.
	Wider Society
	➢ The area is described as the 'green lungs' of the Central Belt. ➢ The presence of wild land in close proximity to populated areas is valuable for mitigating anthropogenic activities locally. ➢ This area has great potential to play an important part in wider efforts to restore peatlands and improve biodiversity at a national scale. The wild land area contains one of only ten Special Protection Areas for hen harriers in Scotland. ➢ The cultural heritage of the wild land area is thought to be conserved due its wild land qualities and lack of development. There is evidence

	of industrial activity, e.g. old iron foundry and the remains of an old railway system that was used to transport visitors into the area for grouse shooting. Old plane crash sites also attract visitors.
Constraints	**Community**
	➢ Some infrastructure is required to make better use of the area. Car parks, better footpaths and some signposting would improve the area which is currently considered to be under-used. ➢ Maintaining the area as 'wild land' has a cost to the community in that this reduces the scope for development in an area which would offer other benefits, e.g. the economic benefits of commercial forestry. Discouraging investment in certain land management practices, e.g. sensitively planned plantations, may reduce general investment in the wider area and lead to negative impacts on wild land and the local community. ➢ A low number of people use the core of the wild land area. Questions were raised about whether it could be put to better use.

Management activities in the area

Activity	*Does activity enhance or detract from wildness qualities?*
Commercial forestry	Native species are being planted in the wild land area as part of a planting scheme which is expected to enhance biodiversity and wild character. However, creating access for forestry operations will have a negative impact.
Control of invasive plants e.g. Himalayan balsam, Japanese knotweed and rhododendron	Reducing the extent of invasive plants enhances wildness.
Sheep grazing	A long history of grazing has shaped the landscape and given it much of its current character. There is also a view that the area is overgrazed, leading to erosion and a lack of scrub habitat. Reduced grazing would enhance the area's wild qualities.
Management for hen harriers	Landowners and tenant farmers receive SRDP grants to manage grazing levels and restrict fertiliser use, which enhances habitat for hen harriers and wider biodiversity.

Do wild land qualities benefit or impinge on management activities?

Forestry is constrained physically in the higher parts of the area due to high winds and deep peat.

Facts and figures about the wild land area

- 91% of visitors to Clyde Muirshiel Regional Park come from local areas (Renfrewshire, Inverclyde, North Ayrshire and Glasgow).
- Muirshiel visitor centre received 35,721 visitors during the year 2012-13 (from visitor survey of Clyde Muirshiel Regional Park, 2013).

General comments on the wild land area (e.g. aspects which make area unique, relevant context for area)

A common theme discussed in relation to Waterhead Moor is its 'unrealised potential'. Some interviewees feel that it is difficult to consider the area 'wild' in light of the considerable

ecological restoration they think should be carried out in the area. It is viewed as an area considerably modified by historic and current land management practices, e.g. the area was previously popular for grouse shooting and has been heavily grazed. The area would have high potential for carbon sequestration and natural flood management if peatland restoration were carried out. Constructive dialogue is ongoing between Clyde Muirshiel Regional Park and local farmers about peatland restoration. There is a Special Protection Area for hen harriers within the area and it is thought that restoration is needed to increase their numbers as they are not currently doing well. Increased legal predator control in the area may increase breeding success.

There is general agreement locally that wind farms should not be constructed in the wild land area and so far this has been prevented, partly due to the wild land status of the area.

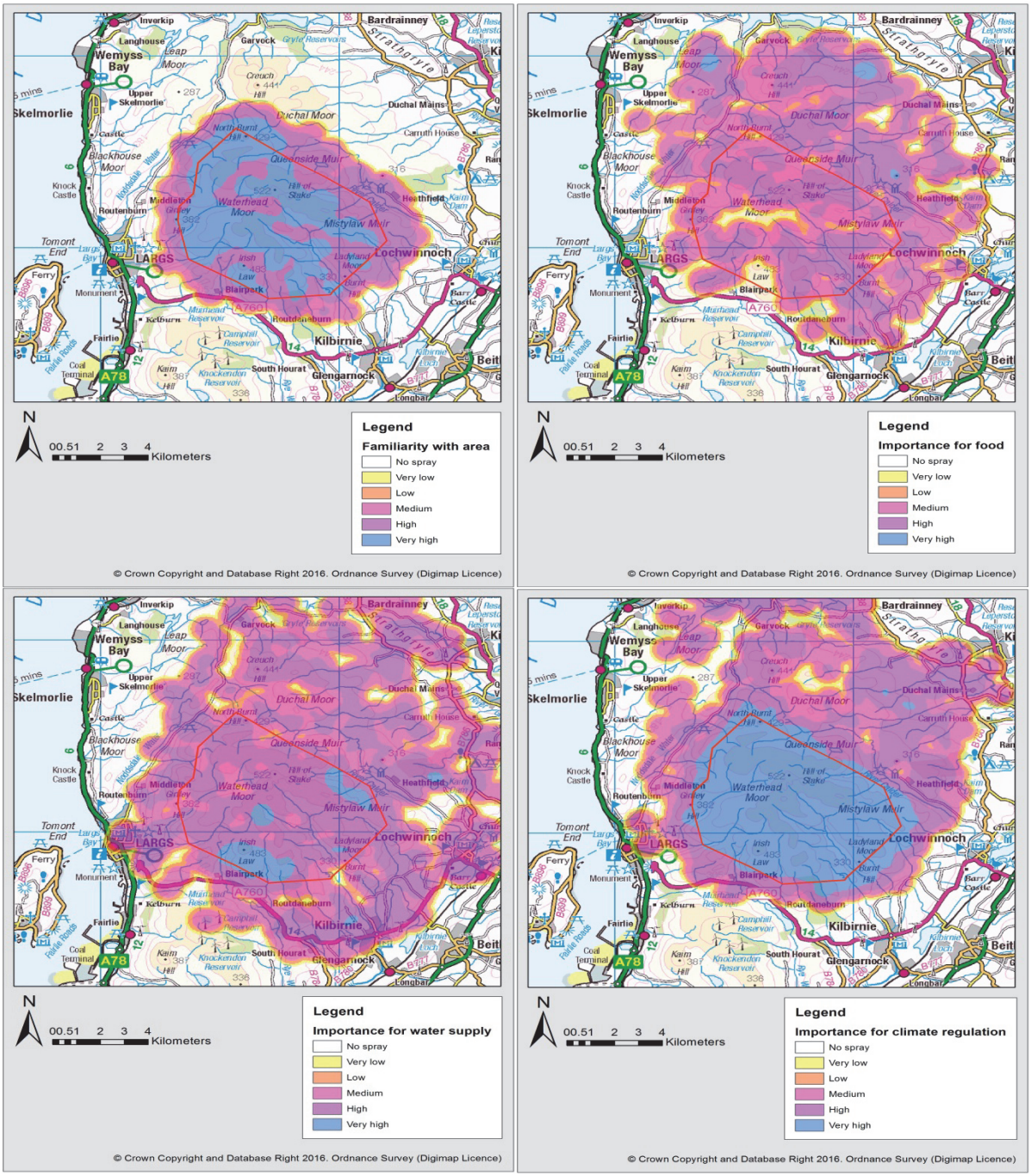
The area is highly significant for local urban populations. While the number of people using the core of the area for walking etc. is thought to be low, the Clyde Muirshiel Regional Park receives a considerable number of visitors at the Muirshiel visitor area and the overall scenic value is very important.

How are ecosystem services provided by the wild land area? (see Map panel 9)

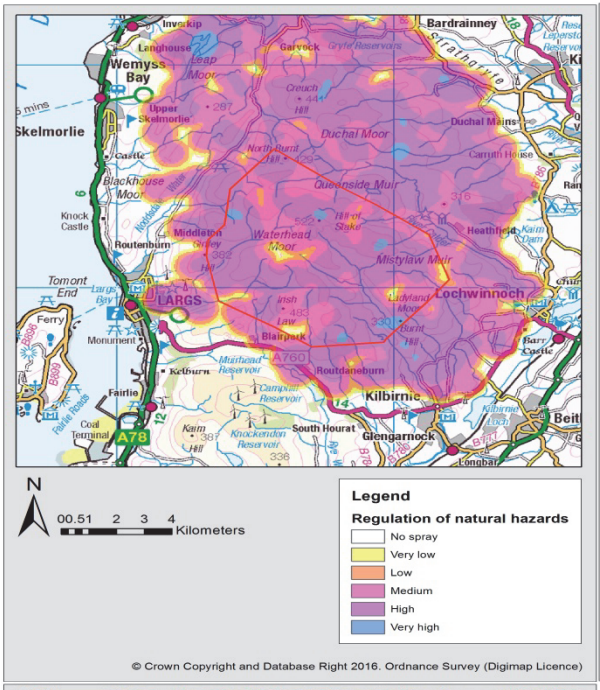
Most of the ecosystem services are viewed as being of moderate to high importance across the entire wild land area and beyond the boundary, which reflects the comments made by interviewees about their aspirations for viewing the land as extending beyond the existing boundary. There is a general view that the wild land qualities of the area have great potential for delivering ecosystem services but that habitat restoration is needed to realise the potential benefits fully, as the ecological condition of the area is poor. Almost the whole area is considered to be of moderate to high importance for ‘wildlife and habitats’ but there is an opportunity for substantial restoration and improved management which would allow wildlife to thrive. ‘Food production’ is of moderate importance and largely based on sheep farming. The lack of people visiting the core of the area means that food production doesn’t come into conflict with visitor access. The area is important for ‘water supply’ for local reservoirs and communities. The extensive peatlands in the area are of great importance for carbon storage. The restoration of degraded bogs in the area would enhance the capacity for ‘climate regulation’ further. The area has an important role in flood regulation and tends to hold water well; there is reportedly only occasional flooding of downstream settlements. The map shows that the area is considered to be very important for ‘tourism and recreation’. The area attracts walkers but also people who enjoy the scenic value of the area from nearby roads without venturing far into it. Areas of importance for ‘cultural heritage’ are patchily distributed on the map and some important sites are located outside the wild land area, e.g. two Roman Fortlets. The area has a long history of industrial activity, e.g. mines, agriculture and game management, which has shaped the landscape and has cultural significance.

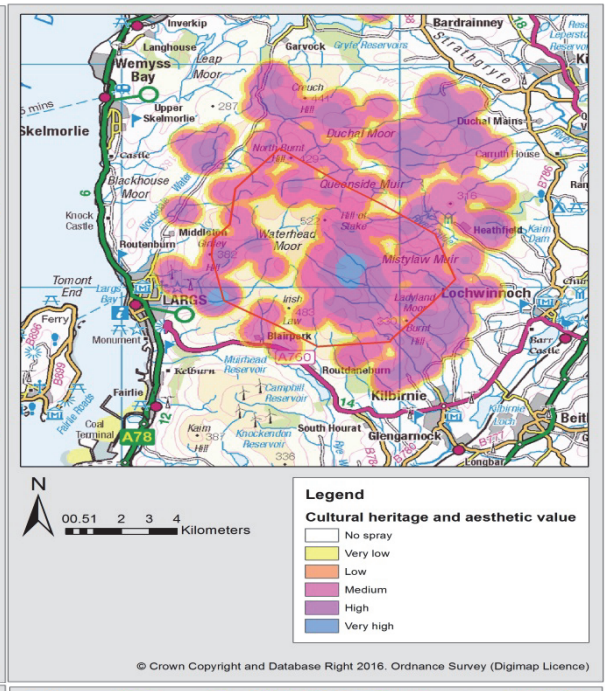
Case study: Waterhead Moor - Muirshiel

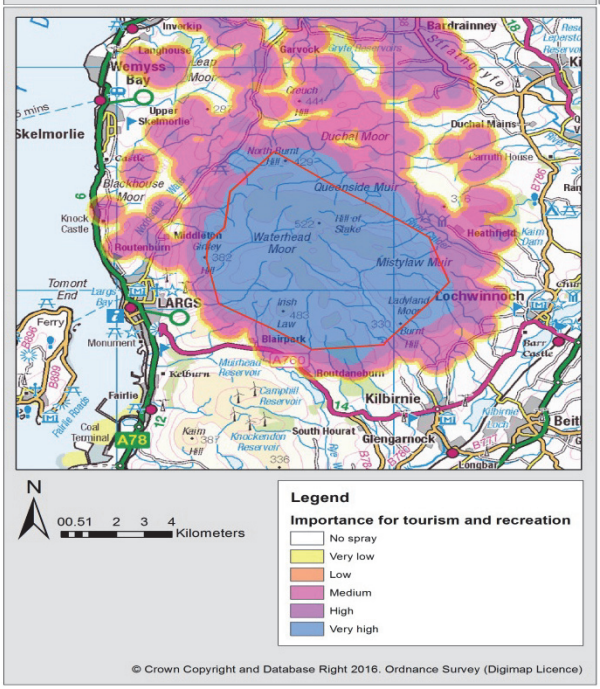
Map panel 10: Waterhead Moor-Muirshiel. Familiarity with area and the importance of area for food production; water supply; climate regulation; natural hazard regulation; cultural heritage; tourism and recreation; and wildlife and habitat as indicated by Map-Me survey respondents (based on 2 responses).

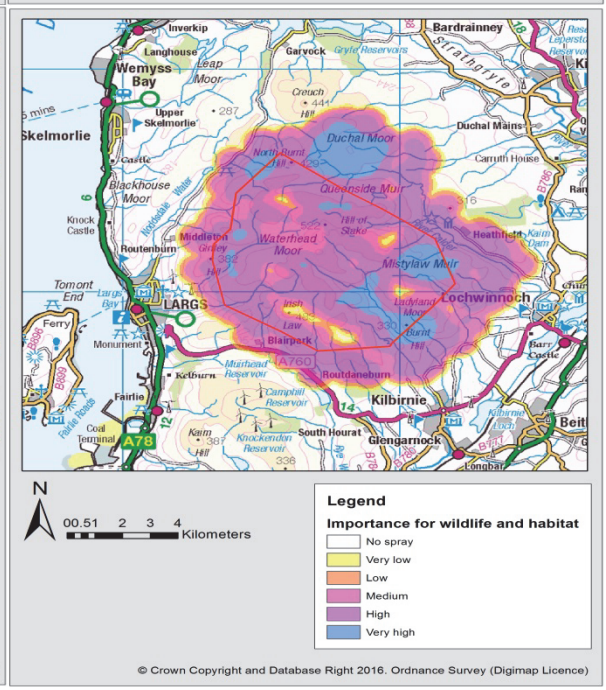


Case study: Waterhead Moor - Muirshiel









7. CASE STUDY SYNTHESIS

This section identifies the emerging themes from the case studies in relation to the benefits and potential constraints of wildness qualities and landscape management.

7.1 Benefits of wild land

Overall there was a positive response to wildness qualities within the case study areas. Opportunities for landscape appreciation and aesthetic landscape qualities were repeatedly highlighted within case studies as a key benefit linked to the presence of wild land. Specific case studies were recognised as containing iconic mountain landscapes of the highest scenic quality (e.g. the Cairngorms plateau, North Harris, the Black and Red Cuillin and Glencoe). The case studies also included relatively unique landscapes such as the flatter, peat-dominated landscape of Causeymire and landscapes with a regional distintiveness (e.g. the ruggedness of Merrick within the more rounded landscape context of the wider Southern Uplands). Wildness was often recognised as a defining characteristic of the wider region (e.g. in the Cairngorms) and linked to both a local-regional sense of place and to elements of Scottish identity and culture. Notably, the importance of the existence value of Wild Land Areas (even to those not using them) was also highlighted in some case studies.

The **personal wellbeing, mental and spiritual benefits** of being able to experience the wildness qualities were repeatedly perceived as highly important values associated with the Wild Land Areas. The opportunity to experience 'wildness' is considered to be important for a healthy society, particularly in relation to the 'restorative' values of wild land for those seeking to 'get away' from their daily routines/lives and experience a different landscape in a remote setting. In a number of case studies the existence of wild land was recognised as contributing to quality of life at personal, community and wider societal levels. A very wide range of high quality recreational opportunities were recognised as linked directly to Wild Land Areas, including winter, water-based (e.g. skiing, sea kayaking etc.) and night time activities (e.g. Dark Sky Park). While all of the Wild Land Areas were valued for the wellbeing benefits they provided visitors, those areas closer to more highly populated areas (e.g. Waterhead Moor, Muirshiel and North Arran) were particularly significant in terms of providing accessible wild places (e.g. for people from the central belt).

The importance of Wild Land Areas for **wildlife and habitats** was clearly evident. This emerged particularly in the ecosystem services mapping survey where wildlife and habitats were frequently the most important ecosystem service to be mapped in each Wild Land Area in terms of spray density and coverage. The way in which the remote and rugged nature of Wild Land Areas reduces human disturbance was described as very important for creating refuge habitats for species of conservation significance (e.g. golden eagle) and those that are sensitive to human disturbance. Wild Land Areas were also recognised as containing large-scale areas of semi-natural habitats.

Ecological restoration of habitats was a common point of discussion across the case study areas and offers a potential avenue for linking ecosystem services with wildness qualities. In Waterhead Moor, for example, the 'unrealised benefit' of the area was a common theme. There is real potential for collaborative peatland restoration in this Wild Land Area to deliver high quality ecosystem services underpinned by wildness qualities. The ecosystem services mapping showed that people are aware of extensive areas of peatland within many of the Wild Land Areas (e.g. Causeymire, Harris, Muirshiel) and the importance of this for carbon storage was frequently described. The remote and often undisturbed nature of wild land means that this resource has been protected from exploitation and damage, and continues to provide a very important societal benefit.

Wild Land Areas were also thought to be important for **natural flood management** provision due to their extensive bog habitats and healthy vegetation, which can reduce water run-off to surrounding areas.

Many of the case study areas attract high numbers of tourists with **tourism** often a key aspect of the local economy. The wildness qualities promoted within these areas were regularly described as important points of attraction for tourists. The ecosystem services mapping evidenced recreation and tourism often occurring at 'hotspots' such as mountain summits; in the smaller case study areas participants also mapped visitor impacts as occurring beyond the boundaries of the Wild Land Area (evidencing the impact of the Wild Land Area to surrounding communities). Wild land qualities are widely used to market the Wild Land Areas for tourism and for promoting local products. Imagery from many of the case study areas is used for marketing through the use of pictures on websites and product packaging, and also the inclusion of descriptions in tourist literature, for example, Arran is described as 'Scotland in miniature' and Fort William/Lochaber as the 'Outdoor Capital of Scotland'. The Cairngorms region was recognised as being characterised and marketed through the wild character of its woodlands and mountain core. In some of the Wild Land Areas (in particular Merrick and Waterhead – Muirshiel), the explicit promotion of wildness qualities to tourists has the potential to be exploited further. Wild Land Areas were also recognised as representing a natural resource base for new business opportunities linked to nature-based or eco-tourism, a strongly emergent market.

7.2 Constraints of wild land

There are also some perceived constraints associated with wild land qualities and the wild land area status, although these were less frequently mentioned than the benefits.

There were some concerns that what were perceived to be **sensible and sensitive developments could be prevented** (due to wild land protection) in areas where they could provide economic benefits for the community, e.g. commercial forestry plantations, renewable energy schemes. Interviewees in several case studies commented on the need for a balance between the needs of local people and the management of the land. The association of an area with wild land (regardless of the actual boundary of the Wild Land Area) was, in some cases, viewed as a barrier to development. Poor infrastructure (particularly with regards to internet/phone services) has potential for negative impacts on local populations and businesses; this may be perceived as being linked to wild land qualities, although it reflects general rural constraints across Scotland. The economic benefit of visitors to Wild Land Areas was also noted in some cases as commonly occurring in larger settlements, with less impact in smaller communities closer to actual Wild Land Areas.

A theme that frequently emerged across a range of case studies was a **perceived trade-off between the benefits of encouraging visitors to Wild Land Areas, in terms of the local economy and the enjoyment of the visitors, and preserving the wild qualities of the areas**. This is a delicate balance to strike, particularly in tourism 'hotspots' which are present in many of the case studies. Visitor numbers were generally seen as increasing and pressure existed in some areas to provide more infrastructure (e.g. car parking, path networks) for visitors, which would increase their numbers further, with potentially negative impacts on the wild land (e.g. in relation to wildlife disturbance, soil erosion or loss of solitude). However, providing footpaths can prevent damage by keeping people in certain areas (as well as facilitating people's enjoyment of wild areas). This is a manageable conflict in some respects, for example limited footpaths can be built to fit in with the natural environment. Some wider land use trade-offs were also perceived in some case studies, with protection of wildness viewed as potentially clashing with traditional land uses in some cases (e.g. fencing, muirburn).

7.3 Management of Wild Land Areas

A considerable range of land management practices take place across the Wild Land Areas. These areas are perceived to be relatively unproductive and hence management intensity tends to be low (SNH's 2002 policy statement *Wildness in Scotland's Countryside* states that low intensity land uses are generally compatible with maintaining the wild character of Wild Land Areas). Interviewees expressed the importance of management to maintain the qualities of wild land but also recognised that some aspects of management also inevitably detract from the wildness qualities of these areas.

Deer management was a common theme in relation to the management of Wild Land Areas. Most viewed some deer management as essential to allow regeneration of woodland. Many management practices trade-off a loss of some aspect of wildness, e.g. the visual intrusion on the landscape by deer fencing, for a gain in another aspect such as regeneration of forests in the future.

There is general agreement that **Wild Land Areas require management** to provide a diverse range of benefits to individuals, communities and society and this often requires a certain level of infrastructure. Some interviewees made the point that a completely unmanaged landscape would be less accessible to visitors due to the development of rank vegetation. Path development and maintenance was frequently referred to as an important component of existing and long term management of Wild Land Areas to manage visitors and minimise soil erosion. The wildness qualities of the areas influence the management practices that take place and their intensity. Wild Land Areas tend to have unproductive soils so there is limited opportunity for agriculture and the lack of land use options for these areas was frequently mentioned. However, the wildness qualities can also be enhanced by management. For example, the sporting industry benefits from providing sporting experiences in beautiful landscapes and the quality of local products, e.g. meat and water supply, is reportedly higher as a result of extensive management.

During discussions about cultural heritage, interviewees often described the long history of land management in case study Wild Land Areas which has shaped the landscapes. There are **physical remnants of past activity which are valued** in the area and there was also a sense that there should be a greater understanding of the significant role of people in the history of the Wild Land Areas, dispelling the notion of these areas being 'untouched'.

7.4 Wild land status

A potential constraint of wild land area status was perceived to be the **interaction with conservation designations** within the areas. There was a feeling amongst some that overlaying Wild Land Areas onto existing designations would prevent holistic management practices being adopted, although it was also suggested that Wild Land Areas could be managed in ways that would better coordinate and link up the aims and activities of the designated areas within them. For some there was a feeling that wildness qualities consist of the **unquantifiable or intangible aspects of landscapes**. Integrating these important but subjective attributes within the remits, activities and decision making processes of local organisations can be challenging.

Interviewees also described a **lack of understanding and awareness** of the relevance and/or added value of the Wild Land Area in places where other designations or initiatives already exist. This was a pertinent point in Merrick where the objectives of the Wild Land Area are not necessarily 'meaningful' alongside other initiatives such as the biosphere reserve, forest park and natural heritage designations. There is potential to link the Wild Land Areas with established local brands (for example, the 'Outdoor Capital of the UK' label highlighted in the Rannoch case study) to tackle this.

Despite an overall positive response to the wildness qualities, there is a perception amongst some local people in the case studies that they may be disadvantaged by a broader 'wild land' agenda (linking to previous comments about the extent to which some developments may be constrained in these areas). There is potential for greater involvement of local communities in landscape management initiatives in these areas to assist with managing this perception.

7.5 Summary of findings

- Wild land qualities provide a considerable range of benefits to both people and nature
- Wild Land Areas include a wide range of areas of the higest scenic quality, including iconic mountain landscapes of regional, national and international importance.
- These areas allow people to benefit from improved health and wellbeing at personal, community and national scales.
- Wildness and Wild Land Areas represent an important natural asset base for existing and future tourism markets and wild land imagery represents a key element of tourism marketing and branding in many areas.
- Wild land provides important habitats and hosts a range of important native species and considerable potential exists for further ecological restoration in these areas.
- Restoration may enhance the existing ecosystem service benefits of wild land.
- The characterisation of places as Wild Land Areas can also be perceived as a potential constraint to economic development, and local input to the management of these areas may help to address this concern.
- A variety of management activities take place in the Wild Land Areas and these are important for maintaining wild land qualities and ensuring benefits to people and nature.

REFERENCES

Bryden, D.M., Westbrook, S.R., Burns, B., Taylor, W.A. and Anderson, S. 2010. Assessing the economic impacts of nature based tourism in Scotland. *Scottish Natural Heritage Commissioned Report No. 398.*

Burkhard, B., Kandziora, M., Hou, Y. and Müller, F. 2014. Ecosystem Service Potentials, Flow and Demands – Concepts for Spatial Localisation, Indication and Quantification, *Landscape Online,* 34, 1-32.

Centre for Recreation and Tourism Research, 2013. Developing Mountain Biking in Scotland, Review of Mountain Biking Developments and Potential Opportunities in the Scottish Enterprise Area, Final Report, University of the Highlands and Islands.

Ekos, 2009. Economic Value of Mountain Biking in Scotland, Report for Scottish Enterprise, Tourism Resources Company and Ekos Limited.

FAI, 2001. *An Economic Study of Scottish Grouse Moors: An Update. Report for the Game Conservancy Scottish Research Trust*. Fraser of Allander Institute for Research on the Scottish Economy, University of Strathclyde.

FAI, 2010. *An Economic Study of Grouse Moors*, A report by the Fraser of Allander Institute to the Game & Wildlife Conservation Trust Scotland. http://www.gwct.org.uk/media/350583/An-Economic-Study-of-Grouse-Moors.pdf

George Street Research and Jones Economics, 2004. *Economic Impact and Development Opportunities for Outdoor and Environment Related Recreation in the Highlands and Islands.*

Hanley, N., Alvarez-Farizo, B. and Shaw, W.D. 2000. Rationing an open-access resource: mountaineering in Scotland, Discussion paper 2000-12, Economics Dept, University of Glasgow, www.gla.ac.uk/media/media_22312_en.pdf

ICTHR, 2010. *The Economic Impact of Wildlife Tourism in Scotland*. International Centre for Tourism and Hospitality Research, Bournemouth University. Research commissioned by Scottish Government Social Research.

McMorran, R., Price, M.F. and McVittie, A. 2006. A review of the benefits and opportunities attributed to Scotland's landscapes of wild character. *Scottish Natural Heritage Commissioned Report No. 194*. http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/wild-land-policy/

PACEC (Public and Corporate Economic Consultants, Cambridge), 2006. *The Contribution of Deer Management to the Scottish Economy.* Report commissioned by the Scottish Association of Deer Management Groups.http://www.deer-management.co.uk/wp-content/uploads/2014/03/PACEC-Report.pdf

PACEC (Public and Corporate Economic Consultants, Cambridge), 2016. *The Contribution of Deer Management to the Scottish Economy.* Report commissioned by the Scottish Association of Deer Management Groups. http://www.deer-management.co.uk/wp-content/uploads/2014/03/PACEC-Report.pdf

Putman, R. 2012. Scoping the economic benefits and costs of wild deer and their management in Scotland. *Scottish Natural Heritage Commissioned Report No. 526.* http://www.snh.org.uk/pdfs/publications/commissioned_reports/526.pdf

Russell, K., Hendee, J.C. and Cooke, S. 1998. Social and Economic Benefits of a US Wilderness Experience Program for Youth-at-Risk in the Federal Jobs Corps. *International Journal of Wilderness,* 4(3), 32–38.

Scottish Mountain Rescue, 2014. Annual Statistics Report 2013. http://www.mountainrescuescotland.org/wp-content/uploads/2015/03/Annual-Report-2013v32-.pdf

SNH, 2014. Map of Wild Land Areas. http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/mapping/

TNS, 2005. Scottish Recreation Survey: annual summary report 2003/4. *Scottish Natural Heritage Commissioned Report No. 105*. http://www.snh.org.uk/pdfs/publications/commissioned_reports/F02AA614-2.pdf

TNS, 2008. Scottish Recreation Survey: annual summary report 2006. *Scottish Natural Heritage Commissioned Report No. 295.* http://www.snh.org.uk/pdfs/publications/commissioned_reports/B303773.pdf

TNS, 2013. The GB Tourist Statistics 2013. http://www.visitscotland.org/research_and_statistics/tourismstatistics.aspx

TNS, 2014. Scotland's People and Nature Survey 2013/14. *Scottish Natural Heritage Commissioned Report No. 679.* http://www.snh.org.uk/pdfs/publications/commissioned_reports/679.pdf

Visit Scotland, 2003. *Tourism in Highlands of Scotland* (HOST) 2003.

Visit Scotland, 2013. Scotland the key facts on tourism in 2013. http://www.visitscotland.org/research_and_statistics/tourismstatistics.aspx

Visit Scotland, 2015. Scotland the key facts on tourism in 2014. http://www.visitscotland.org/pdf/2015%200729%20Tourism%20in%20Scotland%202014_Final%20draft.pdf

Visit Scotland, 2016. Scotland Visitor Survey 2015. http://www.visitscotland.org/pdf/Final%20(external%20use)%20Scotland%20Visitor%20Survey%202015%20updated%208%20March%202016.pdf

Wilson, V. and Stewart, D. 2013. Scottish Recreation Survey: Annual summary report 2012. *Scottish Natural Heritage Commissioned Report No. 604.* http://www.snh.gov.uk/docs/A1020956.pdf

References for the Map-Me tool

Huck, J., Whyatt, D. & Coulton, P. 2015. Evaluating the spraycan: understanding participant interaction with a PPGIS. In Proceedings of the 23rd GIS Research UK Conference.

Huck, J., Whyatt, D. & Coulton, P. 2014. Spraycan: a PPGIS for capturing imprecise notions of place. *Applied Geography*, 55, 229-237.

Huck, J., Whyatt, J.D., Yielding, S., Stanford, H. & Coulton, P. 2013. Development and application of a "spray-can" tool for fuzzy geographical analysis. In Proceedings of the 21st GIS Research UK Conference.

Carver, S., Watson, A., Waters, T., Matt, R., Gunderson, K. & Davis, B. 2009. Developing Computer-Based Participatory Approaches to Mapping Landscape Values for Landscape and Resource Management (2009). In S. Geertman, and J. Stillwell (eds.), Planning Support Systems Best Practice and New Methods, pp. 431-448. Springer.

Evans, A.J. & Waters, T. 2007. Mapping vernacular geography: web-based GIS tools for capturing "fuzzy" or "vague" entities. *International Journal of Technology, Policy and Management*, 7(2), 134-150.

Waters, T. & Evans, A.J. 2003. Tools for web-based GIS mapping of a "fuzzy" vernacular geography. Proceedings of the 7th International Conference on GeoComputation.

APPENDIX A: CASE STUDY INTERVIEW SCRIPT

Wild land case study – Interview and mapping survey

This study seeks to understand the social, economic and environmental benefits and impacts of Wild Land Areas. We wish to understand how these benefits and impacts are perceived and experienced by land owners, communities, the general public and other users of this area. This interview and mapping survey will focus on the following wild land case study area: _____

Part A Interview (to be done by phone).

Interviews to be arranged by email – included sending wild land map

Explain wildland definition, brief project background, mapping approaches and introduce the case study area the interview will focus on.

Wildness is a term applied to land with the combined qualities of ruggedness, perceived naturalness, remoteness and absence of human artefacts. Wild Land Areas (WLAs) can be defined as the most extensive areas exhibiting a high degree of wildness in Scotland. It is a characterisation of areas of land and not intended as a designation that restricts land use. Instead these characteristics mean that land use is likely to be of low intensity.

This study seeks to understand the social, economic and environmental impacts associated with the wildness qualities of the case study area. We wish to understand how these impacts are experienced by land owners, communities, the general public and other users of this area.

1. Please tell us a bit about yourself, your role and your involvement with the case study area of land in terms of work, leisure or its wider significance to you and others in the area.

Section 1: Benefits and impacts from the case study area and the management activities that take place there

We would like to find out what general benefits result from the wildness qualities of the case study area and also any negative impacts they have. It would be useful for us if you could supplement your answers to these questions (where possible), with facts and figures about the area based on your knowledge of the area (*prompts in Table 1*).

Table 1: Information about case study areas

Information about wild land case study area. Can you provide any facts and figures or your impressions about how the wild land area can be associated with the following?	
• Number of visitors per annum • Number and types of land-based and tourism related jobs • Local businesses associated with case study area (no. and type) and (where available) related income • Iconic landscapes – such as specific mountains, lochs or views (these might be used to promote the area or Scotland and its products)	• Recreational opportunities (and associated benefits/impacts) – what types of recreation and numbers of participants (e.g. walking, climbing, camping skiing etc.) • Number of residents in/adjacent to the case study area • Facilities/infrastructure in/adjacent to the case study area

2. Do you think the wildness qualities of this area and the management activities that take place within it provide any **benefits to you personally, or to your organisation?**

   If so what are they?

3. Do you think the wildness qualities of this area and the management activities that take place within it provide any **benefits to local communities?**

   If so, what are they?

4. Do you think the wildness qualities of this area and the management activities that take place within it provide any **benefits to the general public/wider society?**

   If so, what are they?

5. **Do you think any of these benefits are unique to this particular area? (please explain your answer)**

6. Do the wildness qualities of this area, or the management that takes place within it, have **any negative impacts on you personally or your organisation?**

   If so, what are they?

7. Do the wildness qualities of this area, or the management that takes place within it, have **any negative impacts on local communities?**

If so, what are they?

8. Do the wildness qualities of this area, or the management that takes place within it, have **any negative impacts on the general public/wider society?**

   If so, what are they?

9. **Do you think any of these negative impacts are unique to this particular area? (please explain your answer)**

Section 2: Management activities in the case study area

10. We would like to ask you what main management activities go on in the case study area and explain:

a) To what extent some of these enhance or detract from the wildness qualities of the area *e.g. greatly enhances wildness qualities, somewhat enhances wildness qualities, no effect, detracts somewhat from wildness qualities, greatly detracts from wildness qualities*)
b) How the wild land qualities of the area benefit or impinge on land management activities
c) Please could you discuss some of the management activities you are aware of (up to 5)

(Remind interviewee of wildness qualities i.e. the combined qualities of ruggedness, perceived naturalness, remoteness and absence of human artefacts)

Prompts for management activities: game management, heather burning, fencing, path construction, woodland management and regeneration, energy schemes, species conservation

PART B Mapping Ecosystem Services in case study area (explanation and orientation exercise completed during phone interview)

The next part of this exercise involves carrying out an online mapping exercise using a tool called 'Map-Me'. The aim of this survey is to find out how you think ecosystem services are provided by the case study area. Ecosystem services are the ways in which society benefits from natural resources and are defined according to various categories. For this exercise we will be asking you to think about the following services.

Ecosystem Services	Example
• Biodiversity	The diversity of plants, animals and habitats in the area. This could include emblematic species
• Food provision	Production of livestock and wild harvest products such as venison and game birds
• Water supply	Water supply for drinking, industrial processes (e.g. distilling), hydropower and natural habitats
• Climate regulation	The capture and storage of carbon , for example in peatland and vegetation
• Hazard regulation	Reducing erosion or landslides and regulating peak water flows to reduce downstream flood risks
• Tourism & recreation	Visits, recreational activities e.g. walking, hunting (deer stalking and grouse shooting), wildlife watching
• Cultural heritage	Preservation of the area's past and current cultural heritage. The contribution of landscape to people's aesthetic experience

We will ask you to indicate the importance of a range of ES in the case study area and you will then be asked to use the mapping tool to show where you think these are provided. To familiarise yourself with the mapping tool, please use this link (http://map-me.org/sites/WLAOS) to take you to a quick orientation exercise before then completing the survey using this link _____

PART C Online mapping survey (to be completed independently following telephone interview)

Section 1: Assessment of ecosystem services delivered in case study area

Please indicate how important you think your area is for wild species diversity (i.e. the diversity of plants, animals and habitats in the area; emblematic species)

Please indicate how important you think your area is for food (i.e. production of livestock and wild harvest products such as game)

Please indicate how important you think your area is for water supply (i.e. water supply for drinking, natural habitats and industrial processes e.g. distilling, hydropower).

Please indicate how important you think your area is for climate regulation (e.g. carbon captured and stored in peat land and vegetation).

Please indicate how important you think your area is for hazard regulation (e.g. reducing erosion or landslides and regulating peak water flows to reduce downstream flood risks).

Please indicate how important you think your area is for tourism and recreation (e.g. visits, recreational activities e.g. walking, cycling, wildlife watching)

Please indicate how important you think your area is for its cultural heritage and aesthetic value (e.g. past and present cultural heritage and aesthetic experiences)

☉ No	Response
○ Very	important
○ Some	importance
○ Don't	know
○ Low	importance
○ Not important at all	

Section 2: Mapping of ecosystem services in case study area

Please now go to the following Map-Me link _____

Please zoom in to the relevant case study area and then use the spray can tool to indicate those areas you are familiar with and subsequently the areas which you think deliver the eight ecosystem services/public benefits shown in Section 1.

For the 8 mapping tasks, zoom into the case study area (demarcated with a boundary line).

Map 1: Spray those areas within the boundary line that you are familiar with

- Can you give reasons for why you are familiar with these areas? e.g. close to where you live, somewhere you work or visit regularly

Map 2: Please spray those areas that you think are important for ***biodiversity*** (*i.e. a* diversity of animal and plant species/habitats present in the area)

- How do you think the wild qualities of the area (remoteness, ruggedness, naturalness and absence of human artefacts) influence ***biodiversity***?

- Do you have any other comments about the way you have marked the map?

Map 3: Please spray those areas that you think are important for ***food*** (i.e. livestock, game/wild food)

- Who do you think benefits from ***food*** production in this area?
  e.g. local community, land owner, tourist, wider society
- How do you think the wild qualities of the area (remoteness, ruggedness, naturalness and absence of human artefacts) influence the production of ***food***?
- Do you have any other comments about the way you have marked the map?

Map 4: Please spray those areas that you think are important for ***water supply*** (i.e. water supply for drinking, industrial processes (e.g. distilling, hydropower) and natural habitats)

- Who do you think benefits from ***water supply*** from this area?
  e.g. local community, land owner, tourist, wider society
- How do you think the wild qualities of the area (remoteness, ruggedness, naturalness and absence of human artefacts) influence the provision of ***water supply***?
- Do you have any other comments about the way you have marked the map?

Map 5: Please spray those areas that you think are important for ***climate regulation***

- Who do you think benefits from ***climate regulation*** processes that take place in this area? *e.g. local community, land owner, tourist, wider society*
- How do you think the wild qualities of the area (remoteness, ruggedness, naturalness and absence of human artefacts) influence ***climate regulation***?
- Do you have any other comments about the way you have marked the map?

Map 6: Please spray those areas that you think are important for ***regulating natural hazards*** **(reducing erosion/landslide or flood peak risks)**

- Who do you think benefits from ***hazard regulation*** processes that take place in this area? *e.g. local community, land owner, tourist, wider society*
- How do you think the wild qualities of the area (remoteness, ruggedness, naturalness and absence of human artefacts) influence ***hazard regulation***?
- Do you have any other comments about the way you have marked the map?

Map 7: Please spray those areas that you think are important for ***tourism and recreation*** (visits, recreation e.g. walking, wildlife watching).

- Who do you think benefits from the ***tourism and recreation*** value of this area?
  e.g. local community, land owner, tourist, wider society
- How do you think the wild qualities of the area (remoteness, ruggedness, naturalness and absence of human artefacts) influence ***tourism and recreation***?
- Do you have any other comments about the way you have marked the map?

Map 8: Please spray those areas that you think are important for ***cultural heritage*** and have high **aesthetic value** (past and present cultural heritage and aesthetic experiences).

- Who do you think benefits from the ***cultural heritage*** value of this area?
  e.g. local community, land owner, tourist, wider society
- How do you think the wild qualities of the area (remoteness, ruggedness, naturalness and absence of human artefacts) influence ***cultural heritage***?
- Do you have any other comments about the way you have marked the map?

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